

NATURAL ENVIRONMENT RESEARCH COUNCIL
SCIENTIFIC SERVICES

OPERATIONS REPORT
OF A THEMATIC MULTISPECTRAL
SCANNER SURVEY
OF 47 SELECTED AREAS OF
THE UNITED KINGDOM
IN 3 PHASES
DURING 1986

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C O N T E N T S

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S U M M A R Y

The Natural Environment Research Council Scientific Services Division on 27th February 1986 commissioned by Telex in outline a 3 phase flying and acquisition programme during the Spring-Autumn period of 1986. This survey, under contract F3/G6/378 covered 47 individual areas of the United Kingdom where ground research projects by University and N.E.R.C. units were being conducted.

The contract period covered by this report from availability of the Daedalus equipment was limited to a 68 day period over the 3 phases as follows, Phase 1, Spring 22 days: Phase 2, Summer 26 days: Phase 3, Autumn 20 days. At the expiry of the nominated periods, contractual flying and acquisition were terminated, irrespective of whether all areas had been flown.

The aircraft used throughout the flying of the 3 periods was the Navajo Chieftain G-BBXX owned and operated by N.E.R.C. from Kidlington Airport through their handling agents C.S.E. Aviation Limited.

The following sectionalised report describes the field operation and equipment in detail, together with an area by area detail summary of areas flown throughout the three phases of the 1986 flying campaign.

P A R T 1

OPERATIONS REPORT

1. INTRODUCTION

The Thematic Scanner survey described in this report was carried out by Hunting Geology and Geophysics Limited on behalf of the Scientific Services Division of the Natural Environment Research Council (N.E.R.C.) of Swindon, Wiltshire. The 47 areas surveyed and covered by this report are 80% of the areas selected by N.E.R.C. to be flown within a maximum period of 59 days as specified in contract document F3/G6/378 of 10th July 1986.

A Piper Navajo/Chieftain aircraft, registration G-BBXX supplied by N.E.R.C. and crewed by C.S.E. Aviation Limited/ Hunting Surveys, fitted with an RC8 survey camera and a Daedalus AADS 1268 thematic scanner commenced flying operations on the 28th April 1986 (Phase I) and was terminated on the 24th September 1986 (Phase III) with two agreed breaks.

The following report describes the operational aspects of the three periods of flying during this fifth season of N.E.R.C. AADS 1268 surveying in the United Kingdom.

2. INVOLVED PERSONNEL

i N.E.R.C. Superintending Officer

Dr. Stuart J. White

ii N.E.R.C. Co-ordinator/Navigator

F.J. Cook

iii C.S.E. Aviation Ltd. Flying Crew

Captain/Pilot	K.C. Jones	31 flights
	A Gunter-Smith	1 flight
	S. George	9 flights

Aircraft Engineers from C.S.E. pool

iv Hunting Geology & Geophysics Ltd

AADS 1268 Engineers/Operators

	D.C. Nind	12 flights
	M.P. Conway	6 flights
	D.D. MacDonald	3 flights
	R.J. Stockham	20 flights
Operations Manager	R.D. Williams	

3. FLYING OPERATIONS

3.1 Aircraft and Operational Bases

The survey was flown using the N.E.R.C. Piper Chieftain aircraft, registration G-BBXX based at Kidlington (Oxford) Airport. For most of the survey flying, sorties commenced from the aircraft home base, however night stop/landings were made at Southend, Swansea, Edinburgh (2) Humberside (4), Blackpool (7), Norwich, Hawarden, Dundee (2) East Midlands (2) Conington, Cambridge, Newcastle, Kirkwall, Inverness (2) and Southampton (1) Southend airfields. during the three periods of ATM flying.

During the third (autumn) period of flying brake failure on the aircraft and other less serious faults caused the loss of 2.5 days of possible acquisition and unscheduled stop overs.

3.2 Flying Specification and Weather Tolerances

In general the areas to be flown were scattered throughout the United Kingdom and, with the exception of areas in Scotland, the Irish Sea and Bristol Channel, were flown from the aircrafts home base Kidlington. This base gave the flying crews the best possible servicing facilities, weather information and communication with N.E.R.C. at Swindon, as well as space for quick-look processing. The specifications for height, haze, cloud and flight direction were laid down by N.E.R.C. and augmented by their co-ordinator/navigator Mr. F.J.Cook. See Table 1. All day by day flight planning and any special flight permits were arranged by the C.S.E. flight crews in their capacity as aircraft operators. A total of 59 operational days was targeted for the three periods, the finally achieved total of 68 days flying are detailed in Table 2 pages 4,5 and 6

TABLE 1

ORIGINAL GENERAL CONTRACTUAL FLYING SPECIFICATION

For the sake of continuity the original flight specifications are repeated hereunder. This specification was not conveyed to Huntings for the 1986 flying programme as its interpretation became the express responsibility of the N.E.R.C. co-ordinator/navigator Mr. John Cook in consultation with the scanner operator of the day. In general the following conditions were complied with:

1. Cloud

Sites can be flown in cloud free or under a complete cover of cloud. For cloud free up to 5 percent patchy cloud or ground shadow can be allowed. For patchy cloud the site should not be flown without clearance from the N.E.R.C. project co-ordinator.

Sites should not be flown without prior clearance where the overall luminescence is constantly varying.

2. Precipitation.

No restriction due to recent rain is necessary.

3. Wind.

Whilst calm conditions are preferable the limiting factor is likely to be turbulence effects on the aircraft.

4. Haze/Visibility

In hazy conditions the scanner operator/crew will be responsible for advising on the likely effect and which channels will be affected. The N.E.R.C. project co-ordinator will then decide. In low light conditions the scanner operator must decide if he can record a satisfactory signal by adjusting the gain.

5. Time.

Ideally all flying between 9.30 hours and 16.00 hours. However, if we get clear mornings and/or clear evenings the N.E.R.C. co-ordinator in conjunction with the crew may alter this.

General. If the aircraft flies and the weather closes in, the principal of "flying a target and see" should be adopted, rather than returning empty handed.

Photography. 30 percent forward overlap unless stated otherwise.

Radios

- i) Can the crew transmit on the aircraft radio so that field teams can listen? On pre-selected areas they should transmit whilst on target and at end.
- ii) The two way radios should be used as needed.
- iii) Radio silence should be observed with the scanner on and the Transponder should be off. These effect the data recording.

Area covered. The scanner should be switched on for the minimum amount of recording to save unwanted subsequent data processing.

3.3 Navigation

Other than the standard aircraft navigation aids, no specific navigation equipment was added to the N.E.R.C. survey aircraft. However a survey navigator was employed and a wide angle survey camera was supplied and installed, the camera being used on specific scanner lines. Standard forward overlap was maintained throughout the survey period.

TABLE 2

AREA NO. 86	NAME	HEIGHT FLOWN (M)			DIRECTION			GROUND SPEED (KMS)			NO OF RUNS			PHASE FLOWN			DATES FLOWN			CAMERA
		P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	
1	BROOMS BARN	-	3500	-	-	-	N/S	-	165	-	3	-	-	*	-	-	-	16/7	-	Y
2/1	BLAKEY RIDGE	1000	1000	-	N	N/S	-	160	160	-	3	3	-	*	-	23/5	22/7	-	-	Y
2/2	GLAISDALE RIGG	-	1000	-	-	N/S	-	160	160	-	3	-	-	*	-	-	22/7	-	-	Y
3	OXFORD FLOOD PLAIN	1000	1000	1000	N/S	N/S	N/S	160	135	160	7	7	7	*	*	26/5	22/7	5/9	-	Y
4	FELTWELL	-	2000	-	-	E/W	-	160	160	-	3	-	-	*	-	-	16/7	-	-	Y
6	RHONDDA	4000	-	4000	N/W	-	S/E	160 165	-	160	2	-	1	*	-	16/5 19/5	-	5/9	-	Y
9/1	SOUTHOVER HEATH	-	800	800	-	N	N	110 160	160	160	-	2	2	-	*	-	18/7	22/7 19/9 20/9	Y	Y
9/2	SWANLEY	800	800	800	N	N	N	150	160	160	2	2	2	*	*	28/4	18/7	20/9	-	Y
10	LEVERTON MARSH	-	2000	2000 4000	-	NW	NE/ SW	-	140	160	-	1	1	-	*	-	15/8	19/9	-	Y
11	MORTEN FEN	4000 800	2000 800	-	E/W	E/W	-	165	160 150	-	3	4	-	*	-	1/5	16/7	-	-	Y
12	SKIPWITH COMMON	-	800	-	-	N	-	140	140	-	-	5	-	-	*	-	22/7	-	-	Y
14	RIFON	800	-	800	N	-	N/S	150 140	-	160	3	-	3	*	-	13/5 16/5	-	11/9	-	Y
15	DERWENT FELLS	4000	-	4000	N/S	-	N/S	165	-	160	3	-	2	*	-	1/5 16/5	-	12/9	-	Y
16	TAY ESTUARY	2300 1000	-	-	N/S, SE/ NW	-	-	155	-	-	2	-	-	*	-	15/5	-	-	-	Y
17	ESTWAITE WATER	800	500	500	-	N	N	155	110	120	1	9	7	*	*	16/5	18/7	10/9	-	Y
18	DINNET	2000	2000	2000	E/W	E/W	E	165	160	160	2	2	2	*	*	14/5 15/5 12/8	24/9	-	-	Y
20	DUDDON ESTUARY	2000	2000	2000	W/S	NW/ SW	NW/ SW	165	140	160	2	2	2	*	*	1/5	10/8 14/8	9/9 11/9	-	Y
21	HOLDERNESS	800	800	500	S/E	S	S	150 140	160	100	4	2	2	*	*	13/5 16/5	22/7	22/9	-	Y
25	BAWTRY	2000	-	2000	N/S	-	N/S	165	-	160	3	-	3	*	-	1/5	-	7/9	-	Y
26/1	BAWTRY	2000	-	2000	N/E/W	-	N/E/W	165	-	160	3	-	3	*	-	1/5	-	7/9	-	Y
26/2	CLIPSTONE	2000	-	2000	S/W/E	-	N/E/W	165	-	160	3	-	3	*	-	1/5	-	7/9	-	Y
28/1	NEW FOREST	2000	2000	2000	SE/ NW	SE/ NW	SE/ NW	165	150	160	2	3	3	*	*	29/4	9/7	7/9	-	Y
28/2	BURGHCLERE COMMON	-	2000	-	-	N	-	-	140 150	-	-	2	-	-	*	-	-	9/7 17/7	-	Y
28/3	YATELEY COMMON	2000	2000	-	-	N	-	-	145	-	-	1	-	-	*	-	-	9/7	-	Y

AREA NO. 86	NAME	HEIGHT FLOWN (M)			DIRECTION			GROUND SPEED (KMS)			NO OF RUNS			PHASE FLOWN			DATES FLOWN			CAMERA	
		P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3		
28/4	BROXHEAD COMMON	-	2000	-	-	-	S	-	-	150	-	-	1	-	-	*	-	-	9/7	Y	
29	AVON VALLEY	-	4000	-	-	-	P H O T O	O N L Y	-	-	4	-	-	-	-	*	-	-	2/7	Y	
30/1	RIVER CONWAY	-	2000	FT	-	-	"	-	-	140	-	-	-	10	-	-	*	-	25/9	Y	
30/4	IRISH SEA	-	2000	-	-	-	N/S	-	-	140	-	-	1	-	-	-	*	-	11/7	Y	
32/1	SHAVESEY FEN	-	4000	-	-	-	N/S	N/S	-	180	160	-	3	4	-	-	*	*	16/7	Y	
32/2	WOODWALTON	-	4000	-	-	-	N/S	N/S	-	180	160	-	3	4	-	-	*	*	16/7	Y	
32/3	MONKS WOOD	-	4000	-	-	-	N/S	N/S	-	180	160	-	3	4	-	-	*	*	16/7	Y	
33/1	STRATHY	2500	-	-	-	-	-	-	150	-	-	2	-	-	-	*	-	-	14/5	Y	
33/2	RIMSDALE	2000	-	-	-	-	N/S	-	165	-	160	1	-	1	-	*	-	*	14/5	Y	
33/3	POLLIE HILL	1000	-	-	-	-	N	-	150	-	150	3	-	3	-	*	-	*	14/5	Y	
33/4	NORTH DALCHORK	2500	-	-	-	-	N	-	150	-	150	1	-	3	-	*	-	*	14/5	Y	
33/5	POULRAY	-	-	-	-	-	-	-	-	-	145	-	-	1	-	-	*	-	23/9 24/9	Y	
34/1	SKOMER ISLAND	4000	-	-	-	-	NW	-	165	-	-	1	-	-	-	*	-	-	16/5	Y	
34/2	WESTANGLE BAY	4000	-	-	-	-	SE	-	165	-	-	1	-	-	-	*	-	-	16/5	Y	
34/3	FRESHWATER WEST	4000	-	-	-	-	NW	-	165	-	-	1	-	-	-	*	-	-	16/5	Y	
34/4	STACKPOLE QUAY	4000	-	-	-	-	NW	-	165	-	-	1	-	-	-	*	-	-	16/5	Y	
35/1	BARTON BROAD	4000	-	-	-	-	N	-	180	-	160	2	-	1	-	*	-	*	29/4 6/5	Y	
35/2	BLEWBURY	-	-	-	-	-	-	-	-	-	160	-	-	1	-	-	*	-	19/9	Y	
37	SOUTHAMPTON WATER	-	2500	-	-	-	NW	-	-	130	-	-	2	-	-	-	*	-	9/7	Y	
42/2	CARNEDDAU COASTAL STRIP	-	-	-	-	-	A B O R T E D	B Y T O O M U C H	C L O U D	-	-	-	-	-	-	-	-	-	14/8	N	
42/3	NANTLE RIDGE	-	2000	-	-	-	-	N/SE	-	-	140	160	-	2	3	-	-	*	*	14/8	Y
43	DOLGELLAU	-	-	-	-	-	-	-	-	-	-	160	-	-	4	-	-	*	-	9/9 11/9 18/9	Y
46 CR	RIVER ESK.	-	1000	-	-	-	-	NE	E S/W	-	100	160	-	4	2	-	-	*	*	5/9 12/9	Y

AREA NO. 86	NAME	HEIGHT FLOWN (M/FT)			DIRECTION			GROUND SPEED (KMS)			NO OF RUNS			PHASE FLOWN			DATES FLOWN			CAMERA
		P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	
47 CR	BRENTWOOD	-	-	2000	-	-	N/S	-	-	160/170	-	-	7	-	-	*	-	-	20/9 22/9	Y
48	ROTHAMSTED	-	-	500	-	-	NE	-	-	110	-	-	1	-	-	*	-	-	5/9	Y
50/1 /CR	AMPFIELD WOOD	-	-	2500 FT	-	-	P H O T O O N L Y	-	-	-	-	-	3	-	-	*	-	-	3/10	Y
50/2 /CR	SOMMERFORD COMMON	-	-	2500 FT	-	-	P H O T O O N L Y	-	-	-	-	-	2	-	-	*	-	-	4/10	Y
50/3 /CR	PICKET WOOD	-	-	2500 FT	-	-	P H O T O O N L Y	-	-	-	-	-	3	-	-	*	-	-	4/10	Y
44/1 /CR	BENTLEY WOOD	-	2500 FT	-	-	-	P H O T O O N L Y	-	-	-	-	5	-	-	-	*	-	2/7	-	Y
44/2 /CR	WHITECROSS GREEN WOOD	-	2500 FT	-	-	-	P H O T O O N L Y	-	-	-	-	1	-	-	-	*	-	2/7	-	Y
44/3 /CR	SHABBINGTON WOOD	-	2500 FT	-	-	-	P H O T O O N L Y	-	-	-	-	4	-	-	-	*	-	2/7	-	Y
44/4 /CR	WATERPERRY WOOD	-	2500 FT	-	-	-	P H O T O O N L Y	-	-	-	-	2	-	-	-	*	-	2/7	-	Y

3.4 Survey Diary, Progress and Serviceability

The following is a summary of events throughout the three survey periods

PHASE 1 APRIL 27TH TO MAY 26TH 1986

April 27th	General preparation of equipment.
28th	Installation of equipment and checks at Kidlington (Oxford) airport plus first productive flights over site 86/9/2 called sorties 1 and 2 with landing at Southend airport.
29th	Sortie 3 flown over area 86/28/1 in dull overcast conditions, area abandoned. Transit to area 86/35/1 one line flown under thin cirrus cloud. Landing at Norwich airport sortie 4 attempted out of Norwich but abandoned after part run over area 86/11.
30th	No flying. Poor weather conditions
May 1st	Sorties 5,6 and 7 flown giving cover over areas 86/11, 86/20. Sortie 5 landed Blackpool, areas 86/15, 86/25, 86/26, 86/20. Sortie 6. Morten Fen with survey camera only. Sortie 7. Weather conditions good some haze.
2nd	Sortie 8. Attempted to fly Ripon area but aborted due bad weather very poor visibility
3th/5th	No flying. Poor weather conditions
6th	Sortie 9, attempted rerun of area 86/14 but aborted attempt due cloud cover and very dark conditions. Transit to area 86/35/1 one line flown in perfect conditions.
7th - 12th	No flying due poor weather
13th	Sortie 10. 2 runs over area 86/14 flown again in marginal weather conditions, area 86/21 flown again with ground shadow. A refuelling landing was made at Newcastle followed by a transit to Edinburgh with a further refuelling landing at Dundee airport, transit flight terminated at 1625 hours.
14th	Two sorties (11&12) flown out of Edinburgh covering areas 86/33/2, 86/33/1, 86/33/4, 86/33/3, 86/18 with areas 33/1, 33/3 and 33/4 partly affected by cloud/shadow.
15th	Sortie 13 and 14 flown out of Dundee. A total of 34 lines were flown over area 86/16, the majority of which were affected to varying degrees by cloud shadow. A further attempt to fly area 86/18 was made, area still affected by cloud. The aircraft returned to Kidlington later in the day.
16th	Two sorties flown, 15 and 16 covering areas 86/34/1, 86/34/2, 86/34/3, 86/34/4, 86/6, 86/14, 86/15, 86/17 and 86/21. Of these areas 86/6, 86/14 and 86/15 were affected by cloud or shadow

	during these flights refuelling landings were made at Blackpool and Humberside airports.
17th-18th	No flying due poor weather conditions.
19th	Sortie 18 attempted out of Swansea airport one run only over area 86/6 achieved.
20th-22nd	No productive flights due weather
23rd	Sortie 20. One area 86/2/1 flown in turbulent conditions, aircraft landed at East Midlands airport. Supplementary flight for HGG carried out in afternoon
24th- 25th	No productive flights due weather
26th	Sortie 22 flown over area 86/3. This completed the spring campaign flying
PHASE 2	JULY 3RD TO JULY 23RD AND AUGUST 10TH-15TH INCLUSIVE
July 3rd	Installation of equipment and general checks at Kidlington.
4th	Test flights and pilot familiarisation. Poor lumination due heavy cloud.
5th-8th	No productive flights due poor weather.
9th	Sortie 2 and first productive flights for summer period over areas 86/28/1; 86/28/2; 86/28/3; 86/28/4; and 86/37/1 in initially good conditions with cloud build up mid morning.
10th	No productive flying. Poor weather.
11th	Sortie 3 flown with flights at 3 different heights over area 86/30/4. A refuelling landing was made at Harwarden.
12th-15th	No productive flights due poor weather. Aborted attempts accounted for sortie numbers 4 and 5 being recorded.
16th	Sorties 6 and 7. 4 areas flown in generally good weather. Areas 86/1; 86/4; 86/11 and 86/32. at 3 different heights with a refuelling landing at Conington.
17th	Sortie 8 attempted but aborted after 1 run over area 86/28.
18th	Sortie 9 flown over area 86/9 in morning. Sorties 10 and 11 flown after refuelling landing at Blackpool. 6 lines flown over area 86/17. No productive flying achieved after refuelling due to cloud cover.
19th	Sortie 12. No productive flights for NERC due unfavourable weather, an attempt to acquire data over a Hunting area was aborted.
20th	No productive flying due weather.
21st	Sorties 13 and 14 attempted but aborted due poor weather. A landing being made at Humberside.
22nd	Sorties 15, 16 and 17 flown with a refuelling landing at Humberside. Areas flown 86/2/1; 86/2/2; 86/3; 86/9; 86/12; 86/21 and 86/28. Cloud cover increasing throughout day.
23rd	Sortie 18 attempted over area 86/20 but aborted due low cloud.

July 24th
to
August 10th No further flying was undertaken until the start of an agreed short extension. Sorties 28 and 29. Area 86/20 flown after which a refuelling landing at Blackpool was made. Sortie 29 was then attempted but aborted due generally adverse weather and poor visibility.

11th No productive flying due bad weather.

12th Sorties 30/31 and 32. Area 86/2 attempted on sorties 30/31. Sortie 32 aborted due low cloud.

13th No productive flying due poor weather.

14th Sorties 33, 34 and 35. Areas 86/20, 86/46CR and 86/42 flown with a refuelling landing at Blackpool. Weather conditions most variable, cloud amounts being major problem.

15th August Sortie 36. 3/8ths cloud, plus haze and a minor engine fault combined to make a short sortie with areas 86/10 and 86/32 only flown.

This completed the summer flying phase.

PHASE 3 SEPTEMBER 4TH TO SEPTEMBER 24TH

4th Sept. Installation of equipment at Kidlington.

5th Sorties 1, 2 and 3. The first sortie of the autumn session was aborted by cloud. Sorties 2 and 3 saw areas 86/3 and 84/46 flown.

6th No productive flights due weather.

7th Sorties 4, 5 and 6 flown in generally good weather conditions and minimal cloud. The following areas were covered 86/6, 86/25, 86/26/1, 86/26/2, 86/28/1 and 86/32/3, 2 and 1 at varying heights.

8th No productive flights due weather.

9th Sorties 7 and 8 flown with haze and developing cloud cover finally leading to an abandonment of sortie 8. Areas 84/20, 86/42 with 86/35 attempted.

10th Sorties 9, 10 and 11 flown, with a refuelling landing at Blackpool. Area 86/17 covered. Cloud persisted.

11th Sorties 12 and 13. Three areas covered with a further landing at Blackpool. Areas 86/14, 86/20 and 86/42 all with some cloud cover.

12th Sortie 14 flown covering areas 86/15, 86/46CR. On landing a 2nd brake failure was experienced thereby cancelling any further flying.

13th No productive flying due aircraft unserviceability.

14th-17th No productive flying achieved though two sorties 15 and 16 attempted. Weather poor.

18th Sortie 18 flown but finally aborted due low cloud and poor light. Areas 86/35 and 86/42 acquired in part.

19th	Sorties 19 and 20 covering areas 86/9/1 and 86/35/2. 86/35/1 and 86/10 flown.
20th	Sorties 21, 22 and 23 flown in generally hazy conditions. Areas flown 86/9/1; 86/9/2 and 86/47CR. During this flying period a refuelling stop was made at Southampton airport and 5 lines of an HGG area were acquired.
21st	No productive flights due an aircraft malfunction.
22nd	2 sorties 24/25 flown in conditions of light haze and high cloud cover and strong cross winds during the flying of area 86/21. Area 86/47CR was also attempted. A landing was made at Humberside.
23rd	A transit to Edinburgh was made and sorties 26/27/28 and 29 were flown. Landings were made at Inverness for refuelling. Extensive low cloud was encountered while attempting to fly areas 86/18 and 86/33/5.
24th	Sorties 30, 31 and 32 were flown out of Edinburgh with landings at Inverness. On completion of flying areas 86/18, 86/33/2; 86/33/3; 86/33/4 and 86/33/5 a transit back to aircraft base at Kidlington was made. This constituted the last flight of the 1986 campaign.
25th Sept.	The ATM equipment was removed from the survey aircraft.

Over the three periods of flying in 1986 the weather conditions were better than 1985 but still of generally poor standard. The summer (Phase 2) session being the worst with 17 days out of a possible 26 being lost due poor weather. Cloud cover has been the most persistent obstacle to good acquisition.

4. EQUIPMENT

4.1 Survey Camera

The camera used for this years N.E.R.C. campaign was a Wild RC8 wide angle survey camera using a 15 uag 396 lens and Kodak XX black/white film. This unit was manually operated throughout the survey period by the survey navigator who adjusted the forward overlap to suit the area being flown. The camera was installed in the existing forward camera hole of the N.E.R.C. aircraft and produced throughout 9X9 format black/white images. The unit had a 6 inch focal length.

The film processing of selected runs was carried out in the photo laboratories of Hunting Survey Ltd, Borehamwood, who over the full season of flying produced a total of 2,380 prints. 764 prints Phase I 803 prints Phase II. 813 prints Phase III. The scale of these prints varied with the differing flying heights of each area. The scale of individual areas together with their

"given" names are noted on the photo title strips. Photo cover was not flown over every ATM area and not all the acquired negatives were commissioned for prints. A copy of the photo flight logs and index maps of lines flown has been supplied with the survey prints. A total of 217 DIA positive negatives were also supplied. These cover the area 86/30 River Conway and were flown at the end of the autumn ATM flying.

4.2 The Airborne Thematic Mapper

The equipment chosen for the 1986 N.E.R.C contract was again the Daedalus Enterprises Inc. AADS 1268 ATM 11 channel scanner.

This complete sensor unit comprises: A scan head, a spectrometer and a digitiser, coupled in, on this survey, to a AADS 1840 HDDT to b/w film conversion unit, an HDDT playback unit and a Sangamo Sabre 80 III tape recorder, model 3630 1" machine. This combination of units enabled onsite production of HDDTs and 5" wide b/w quick-look prints of any one selected channel of data at aircraft base. Scan speeds were selected to suit the areas being flown and were selected from speeds 12.5, 25 and 50 scan/second available on the equipment as a standard. The S bend correction, another equipment standard, was selected and automatically applied over all areas flown. The standard operating wavelengths and performance parameters for the AADS 1268 ATM scanner are as follows:

TABLE 3

PRIMARY CHANNEL BAND	12.5 SCANS/SEC	25 SCANS/SEC	50 SCANS/SEC
CHANNEL EDGES IN μ M	NER 1	NER 1	NER 1
1 0.42 - 0.45	0.28	0.36	0.52
2 *0.45 - 0.52	0.06	0.07	0.10
3 *0.52 - 0.60	0.05	0.05	0.05
4 0.605- 0.625	0.10	0.10	0.11
5 *0.63 - 0.69	0.05	0.05	0.05
6 0.695- 0.75	0.05	0.05	0.05
7 *0.76 - 0.90	0.03	0.03	0.03
8 0.91 - 1.05	0.01	0.11	0.15
9 *1.55 - 1.75	0.07	0.10	0.17
10 *2.08 - 2.35	0.005	0.006	0.009
11 *8.5 -14.0	0.05	0.07	0.08

* Thematic Mapper bands (except thermal band) broadened for aircraft operations.

- i. Noise equivalent radiance in $W \times 10^{-7} \text{ cm}^{-2} \text{ nm}^{-1} \text{ sr}^{-1}$.
- ii Instantaneous field of view (IFOV) 2.5 MRAD (with 1.25 MRAD option).
- iii Digitised field of view 85.92 deg. (2.5 mr IFOV)
It should be noted that this field of view reduces to 72 degrees when the S bend correction is applied, as

throughout this survey.

iv	Velocity/height ratio (based on 2.5 mr IFOV)	0.031 radians/sec 0.062 " "	- 12.5 scan/sec 25.0 " "
		0.125 " "	50.0 " "
v	Roll correction	+/- 15 degrees	
vi	Infrared reference source	2 controllable thermal black bodies with a temperature range of -15 deg. to + 50 degrees C with respect to scan head heat sink temperatures.	

Figure 1 outlines in diagrammatic form the functional operations of both scanner head and the spectrometer.

4.3 Radio Communication Units

8. SMC 317L6 3 watt 6 channel 2-way units were supplied to N.E.R.C. to assist in air/ground movements during over flights of selected areas. The radios were tuned to the Hunting licenced frequency of 169.275 Mhz. This licence having previously been allocated to the Hunting Group by the Home Office.

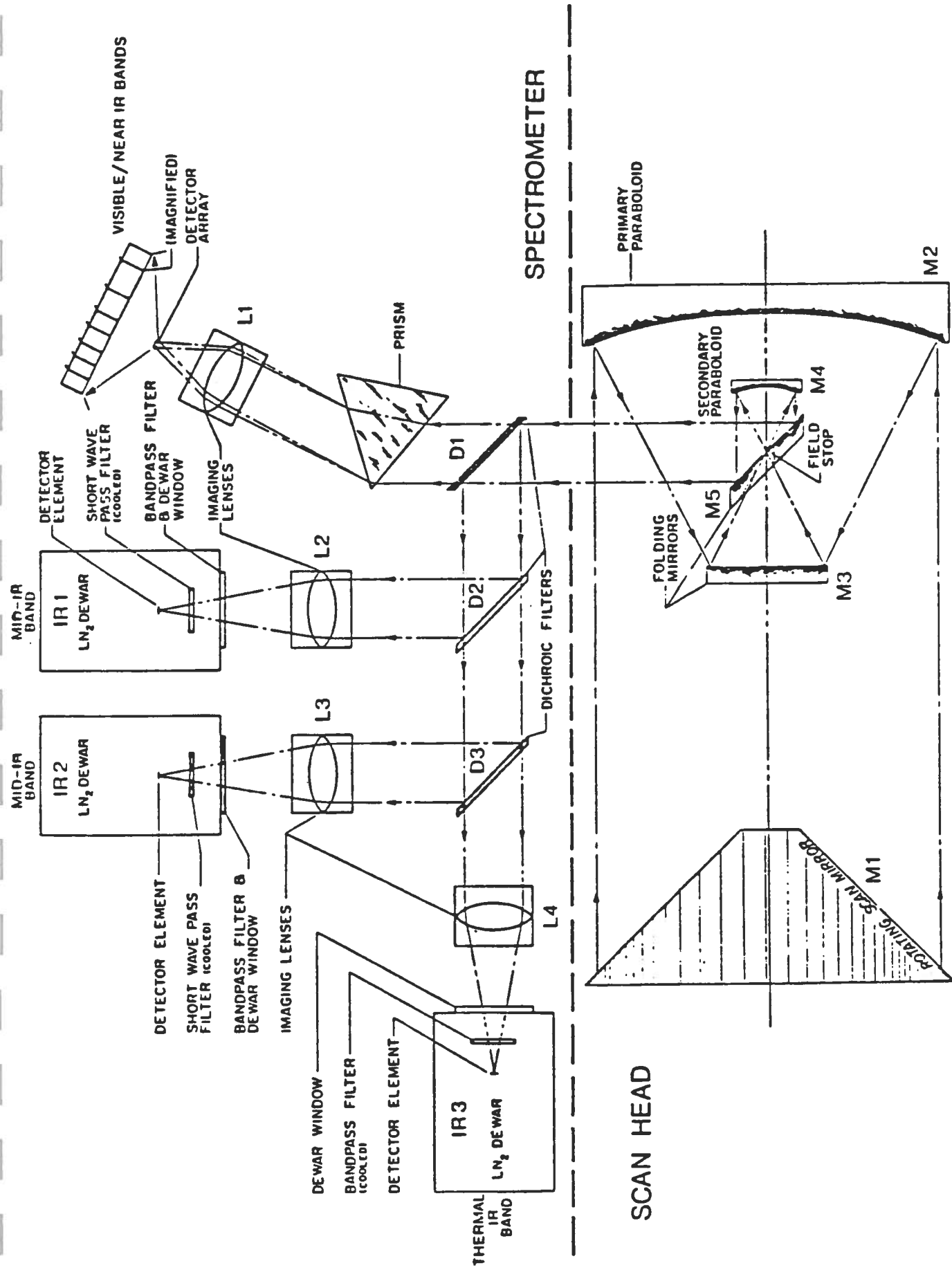
5. DATA ACQUIRED AND PRESENTED

5.1 On site

- a. 12.5 HDDTs (High Density Data Tapes) and one channel of b/w prints of "quick look" imagery were produced progressively throughout the three survey periods. The HDDT usage was carried forward sortie to sortie until total capacity had been achieved. There was no carry forward of HDDTs from one period to the next e.g Spring to Summer to Autumn.
- b. 9 x 9 photo cover was taken on all ATM lines flown and area 86/30 which was not captured by the ATM during period III (autumn). 217 DIA positive negatives covered that area.

5.2 Final presentations

- a. The field produced HDDTs were converted to CCTs in the Hunting laboratories at Elstree on their HP.3000 computer where all channels of data per line flown were



AADS1268 DIGITAL MSS SYSTEM - SCAN HEAD/SPECTROMETER -
OPTICAL DIAGRAM

recompiled with start and scans correlated. No flight line was split onto a second tape. The data is presented on the CCTs in the Hunting's band interleaved raw data format (see description in Table 4). A total of 315 CCT's plus 315 copy CCT's were produced for the 3 periods of 1986.

- b. Parts of entire areas of photo cover taken during the ATM flying were selected by N.E.R.C. or their representative F.J.Cook and presented as either 9x9 B/W prints or dupe film positives in frame form. An index plot of all lines flown with photo cover, showing print and run number on 1:50,000 scale ordnance survey map sheets have also been presented.
- c. A report of operations in 5 copies.

5.3 CCT Format

TABLE 4

HUNTINGS BAND INTERLEAVED ATM RAW DATA TAPE FORMAT

As revision 1.1 of April 1985

1. Daedalus AADS 1268

The Daedalus AADS 1268 is an 11-channel digital airborne scanner recording in the 0.42 to 14.00 μ m region of the electromagnetic spectrum.

The wavelengths of each of the 11-channels are shown in Table 3.

The scanner also records a 12th channel which has the same wavelength as channel 11 but with a gain setting of a half of that of channel 11. This channel can be of particular use when data in channel 11 is saturated.

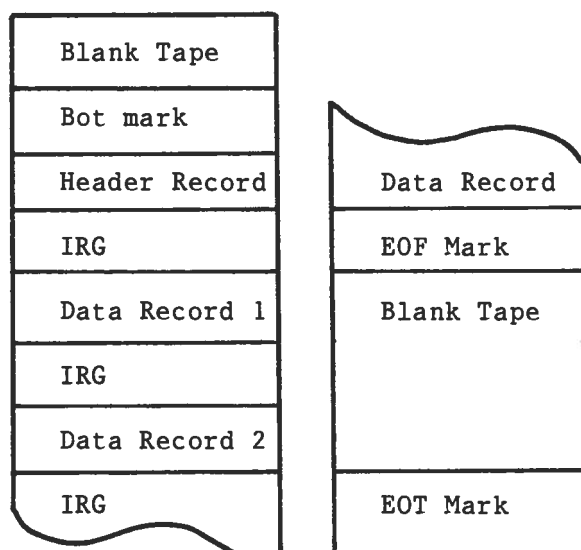
2. Tape Format

Data is recorded on a computer industry standard 0.5 inch nine track magnetic tape with a packing density of 1600 bits per inch (bpi).

3. Recorded Data Format

The data is recorded on the tape in standard band interleaved by line (BIL) format.

The following paragraphs describe how the data is physically organised on the tape.



3.1 Header Record

This record is 576 bytes long and contains ASCII informative data. This record is split into 22 sub-records as described in Table A. Each sub-record is terminated with a carriage return and linefeed.

T A B L E A

Line No.	Length (bytes)	Bytes Nos.	Contents
1	40	1-40	Hunting Geology and Geophysics AADS 1268
2	52	41-92	Clients name
3	13	93-105	Tape nnn
4	23	106-128	Flight Date dd- mm -yy
5	12	129-140	Flight nn
6	34	141-174	Bands n.m.o.p.....
7	39	175-213	Site - erehwon
8	35	214-248	Scan/Frame Count - Start nnnnnn
9	36	249-284	Scan/Frame Count - Finish mmmmmm
10	30	285-314	Ground Clearance nnnn metres
11	25	315-339	Ground Speed nnnn Knots
12	22	340-361	Pixel nn metres wide
13	22	362-383	Pixel mm metres long
14	17	384-400	750 Frame Bytes
15	25	401-425	Record Size nnnnn Bytes
16	24	426-449	Band Frame Interleaved
17	21	450-470	Video Start Byte 24
18	20	471-490	Video End Byte 739
19	13	491-503	BB1 Byte 23
20	14	504-517	BB2 Byte 740
21	29	518-546	n.nn Milliradian Resolution
22	30	547-576	Source HDDT nnn

3.2 Tape Data Record

These records will be of constant size within tape files. That size will depend on the number of channels of data contained in the file.

Table B itemises all the possible data record sizes.

T A B L E B

No.Bands	Block Size(bytes)
1	7500
2	7500
3	9000
4	9000
5	7500
6	9000
7	10500
8	6000
9	6750
10	7500
11	8250
12	9000

The layout of these bytes is shown in Table C.

T A B L E C

Byte No.	Content
1-750	Scan line 1 Channel 1
751-1500	Scan line 1 Channel 2
1501-2250	Scan line 1 Channel 3
etc.	etc.

3.3 Logical Data Record

Logical data records are of a constant size of 750 bytes. They contain the data for one scan line for one channel.

The contents of these 750 bytes are shown in Table D.

T A B L E D

Byte No.	Recording Type	Description
1-4	binary	Start of frame code
5	binary BCD	Run number (4 msb) Extended line count (4 lsb)
6-8	BCD	Line count
9-12	BCD	Thumbwheel setting
13-14	BCD	Calibration source 1
15-16	BCD	Calibration source 2
17-21	binary	External digital data
22	binary	Gain, S bend and channel number
23	binary	Digitised BB1
24-739	binary	Video data
740	binary	Digitised BB2
741-750	binary	End of frame code

3.3.1 Start of Frame Code

This is a 4 byte binary pattern used to synchronise the scan. The contents of the 4 bytes are shown in Table E.

T A B L E E

Byte No.	Contents
1	01010110
2	10100101
3	10100110
4	10101111

3.3.2 Run Number/Extended Line Count

This is a single byte. The 4 most significant bits contain the sortie number in binary. The 4 least significant bits contain the millions digit of the scan line number recorded in binary coded decimal.

3.3.3 Line Count

This is a 3 byte representation of the scan line number which is recorded in binary coded decimal.

3.3.4 Thumbwheel Setting

This is a 4 byte representation of the contents of the thumbwheel of the scanner itself. It is recorded in binary coded decimal.

3.3.5 Calibration Source

These two pairs of bytes contain the temperatures (degrees Celcius) of the scanners two black body references. They are recorded in binary coded decimal as shown in Table F.

T A B L E F

Bit No.	Content
15	Sign bit 0 = negative 1 = positive
14-12	Tens of degrees
11-8	Degrees
7-4	Tenths of degree
0-3	Hundreths of degree

3.3.6 External Digital Data

These 5 bytes contain certain operational parameters for the scanner. The only parameter of any relevance is contained in the two most significant bits of byte 17. These contain the speed at which the scanner is working. See Table G for options.

T A B L E G

Contents of 2 msb byte 17	Meaning
00	12.5 scans/sec
01	25 scans/sec
10	50 scans/sec

3.3.7 Gain, S Bend, Channel Number

These are all contained in a single byte.

The gain and S bend are encoded in the four most significant bits of the byte as shown in Table H.

The channel number is encoded in the four least significant bits of the byte as shown in Table J.

T A B L E H

Contents of 4 msb	Gain Setting	S Bend Setting
0101	8	Out
0100	4	Out
0011	2	Out
0010	1	Out
0001	0.5	Out
1101	8	In
1100	4	In
1011	2	In
1010	1	In
1001	0.5	In

T A B L E J

Contents of 4 lsb	Channel No.
0001	1
0010	2
0011	3
0100	4
0101	5
0110	6
0111	7
1000	8
1001	9
1010	10
1011	11
1100	12

3.3.8 Digitised BB1

This is a single byte which contains the binary representation of the intensity recorded when the scanner was viewing black body reference 1.

This is recorded as if the scanner was set with a gain of 1 for channel 11.

3.3.9 Video Data

These are contained in 716 consecutive bytes and contain the data for 716 pixels across the scan line.

3.3.10 Digitised BB2

This is a single byte which contains the binary representation of the intensity recorded when the scanner was viewing black body reference 2.

This is recorded as if the scanner was set with a gain of 1 for channel 11.

3.3.11 End of Frame Code

These are contained in ten consecutive bytes which contain a binary in pattern used to synchronise the scan. The contents of each of the 10 bytes is 10101010.

4. Common Conventions

4.1 Byte Numbering

The data is packed two bytes per 16 bit computer word. These are numbered in the standard Hewlett Packard form such that the most significant byte is numbered 1 and the least significant 2.

This standard is different from that used by Digital and other computer manufacturers who number them the other way round.

4.2 Bit Numbering

The bits within a 16 bit computer word are numbered 0 to 15 with 0 being the least significant bit.

5. Conclusions

5.1 Input to Image Processing Systems

This data is blocked to gain maximum data content on to CCT which means that it is not readily input to an image processing system.

Input is usually achieved by special software or by deblocking the data.

5.2 Non Hewlett Packard Computers

If this data is to be read on to a non Hewlett Packard computer it may be necessary to swap the bytes within each 16 bit word.

If this is not done the resulting image will look grainy. This shows itself up on straight line features which go diagonally across the image. They will look very stepy.

TABLE 5

EXAMPLE OF TAPE RELATED INPUT DATA

TAPE 1 or 2 or 3 etc.

Site - New Forest 13

N.E.R.C.

Flight Date 26-May-85

Bands 1-2-3-4-5-6-7-8-9-10-11-12

Scan/Frame Count - Start 23000 Scan/Frame Count - Finish 26999

Scan Speed = 12.5 Scans Per Second

Low Blackbody = 17 Low Temp Ref = 14.78 Degrees Celcius

High Blackbody = 252 High Temp Ref = 44.71 Degrees Celcius

Gains=4.0 2.0 2.0 4.0 2.0 4.0 2.0 4.0 2.0 2.0 1.0 0.0

6. MATERIALS SUPPLIED TO CLIENT

6.1 Survey Film

A total of 2380 9"x9" black/white survey photographs plus 217 dupe film positives of varying scales and all negative film produced over the clients selected areas have been supplied to Swindon.

6.2 "Quick Look" Imagery

Uncorrected 5" wide b/w prints of one channel of data along all lines flown were produced with the field equipment and presented to the client for inspection.

6.3 CCTs

An overall total of 315 master CCTs covering all selected areas flown have been supplied, plus a duplicate set as contractually required.

6.4 HDDTs

The field produced HDDTs covering all areas flown are held by Huntings pending a directive as to their disposal within the next 12 months. Total held for 1986 campaign 13.

6.5 Flight Maps

A full set of 1:50,000 scale ordnance survey map sheets covering each area flown, with recovered flight tracks plotted from 9"x9" survey prints superimposed, have been supplied with each periods flying. Duplicate maps have been supplied if area flown again in seperate periods.

6.6 Operations Report

An operations report covering the full 1986 campaign and complete with data tape formats in 5 copies has been presented.

P A R T 2

FIGURES

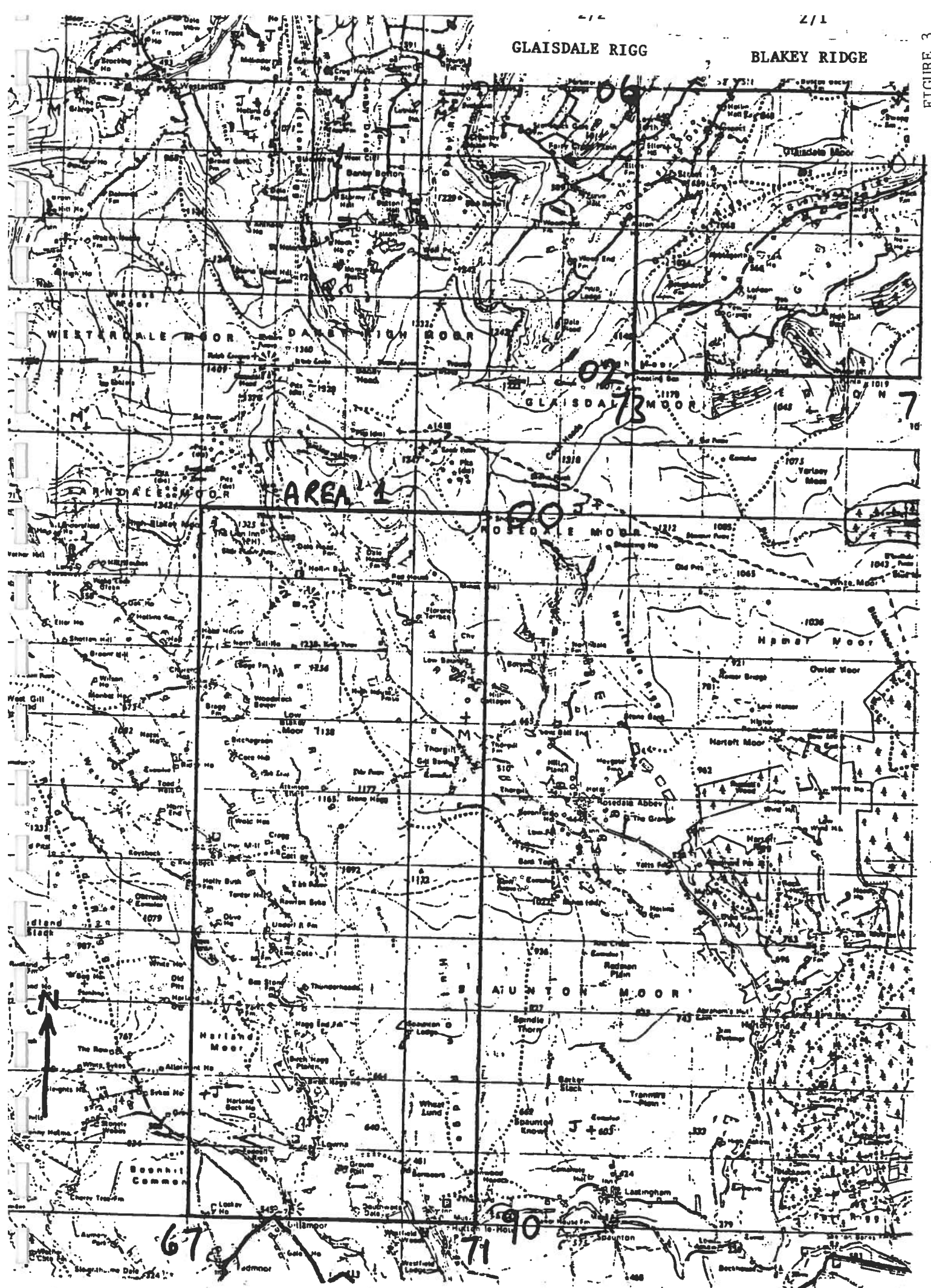
HEIGHTS IN METRES
CONTOUR INTERVAL 15 24(50FEET)

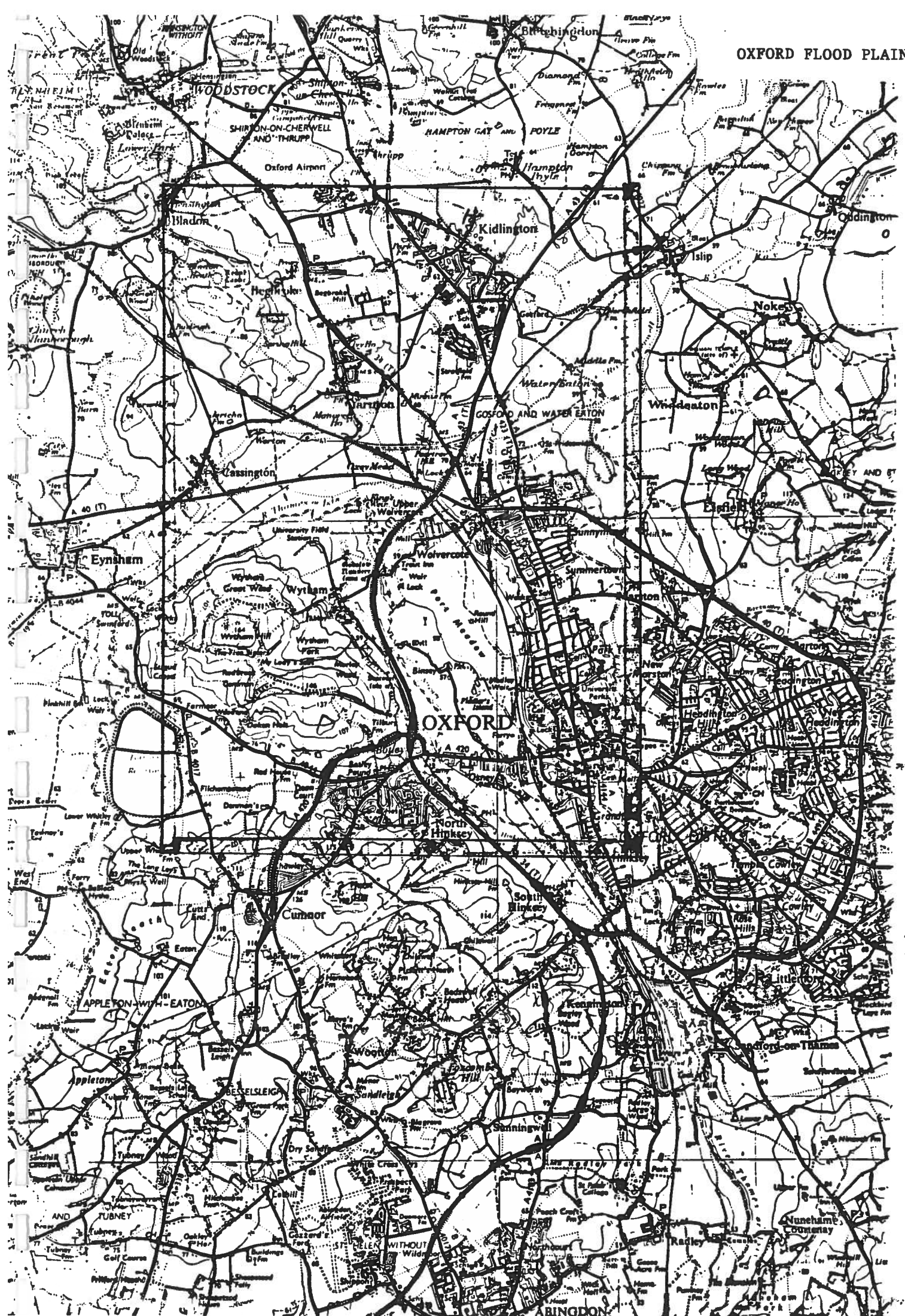
BROOMS BARN

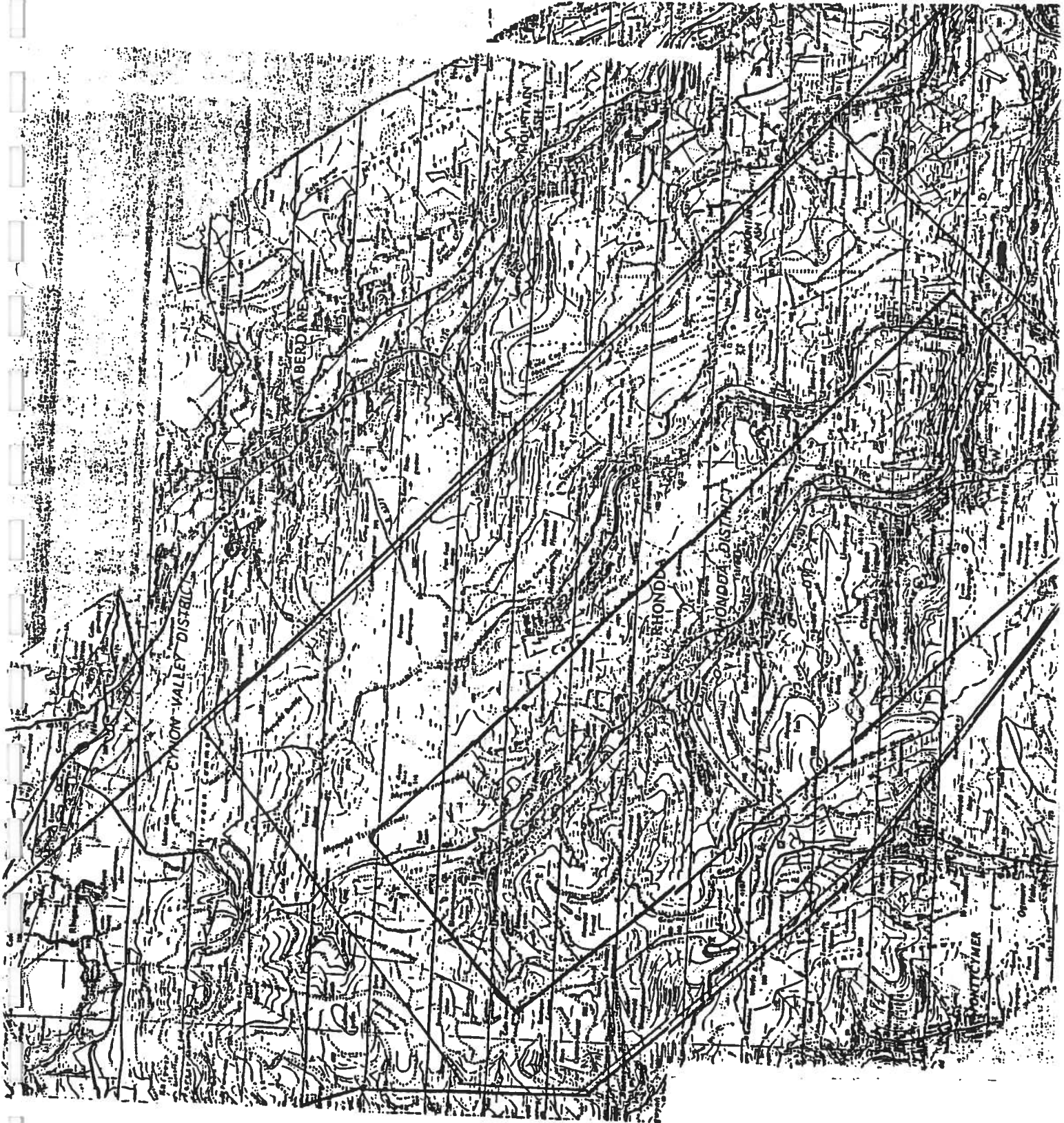
PROJECT REFERENCE 86/1
SITE BROOM'S BARN

— central flight path
- - - outer flight paths









SITE 6

SOUTHOVER HEATH

DART DORSET CO CONST

96

95

94

PURBECK DISTRICT

93

AFFPUDDLE CP

92

SOUTH DORSET C

91

BURLESTON CP

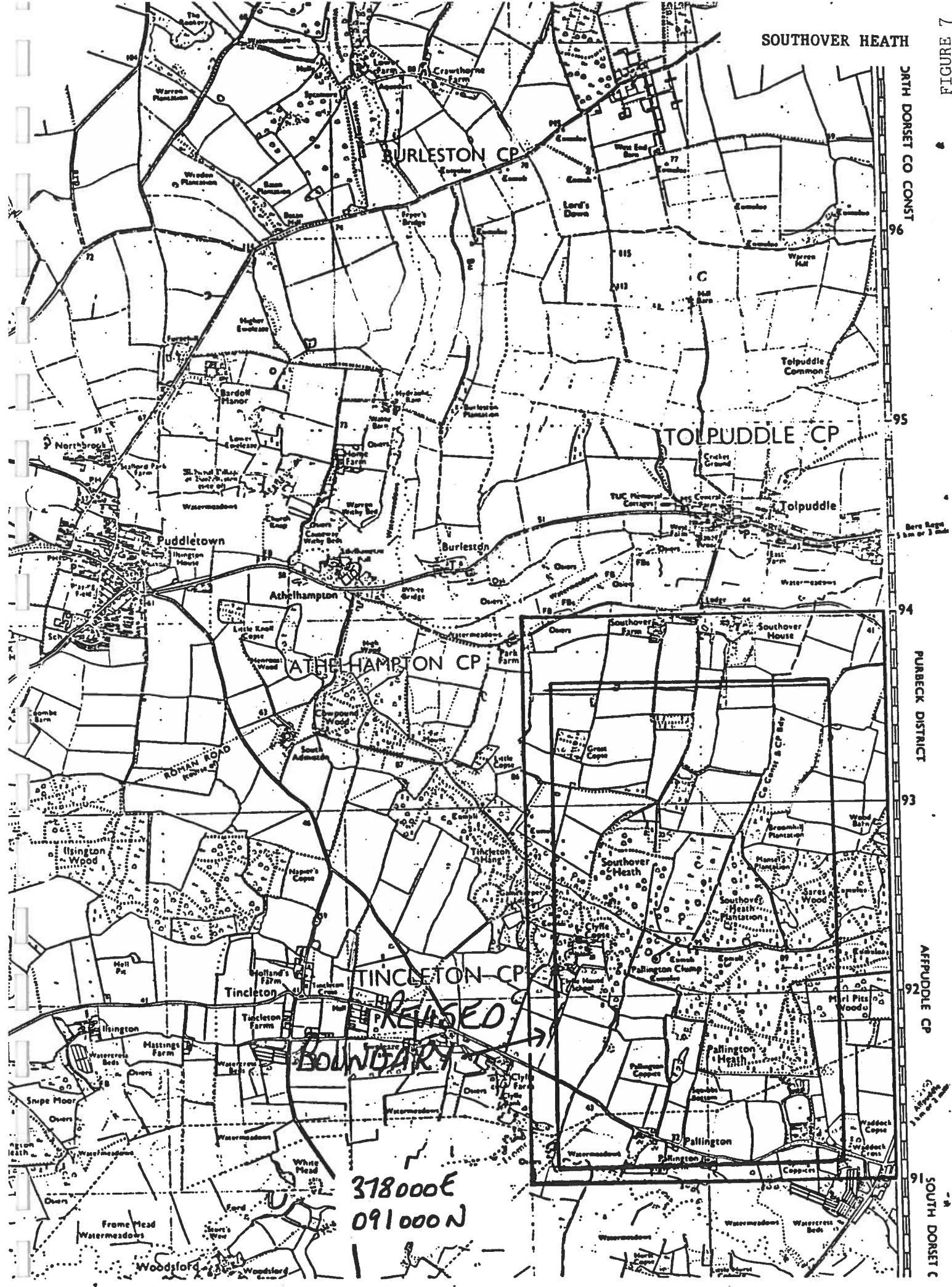
TOLPUDDLE CP

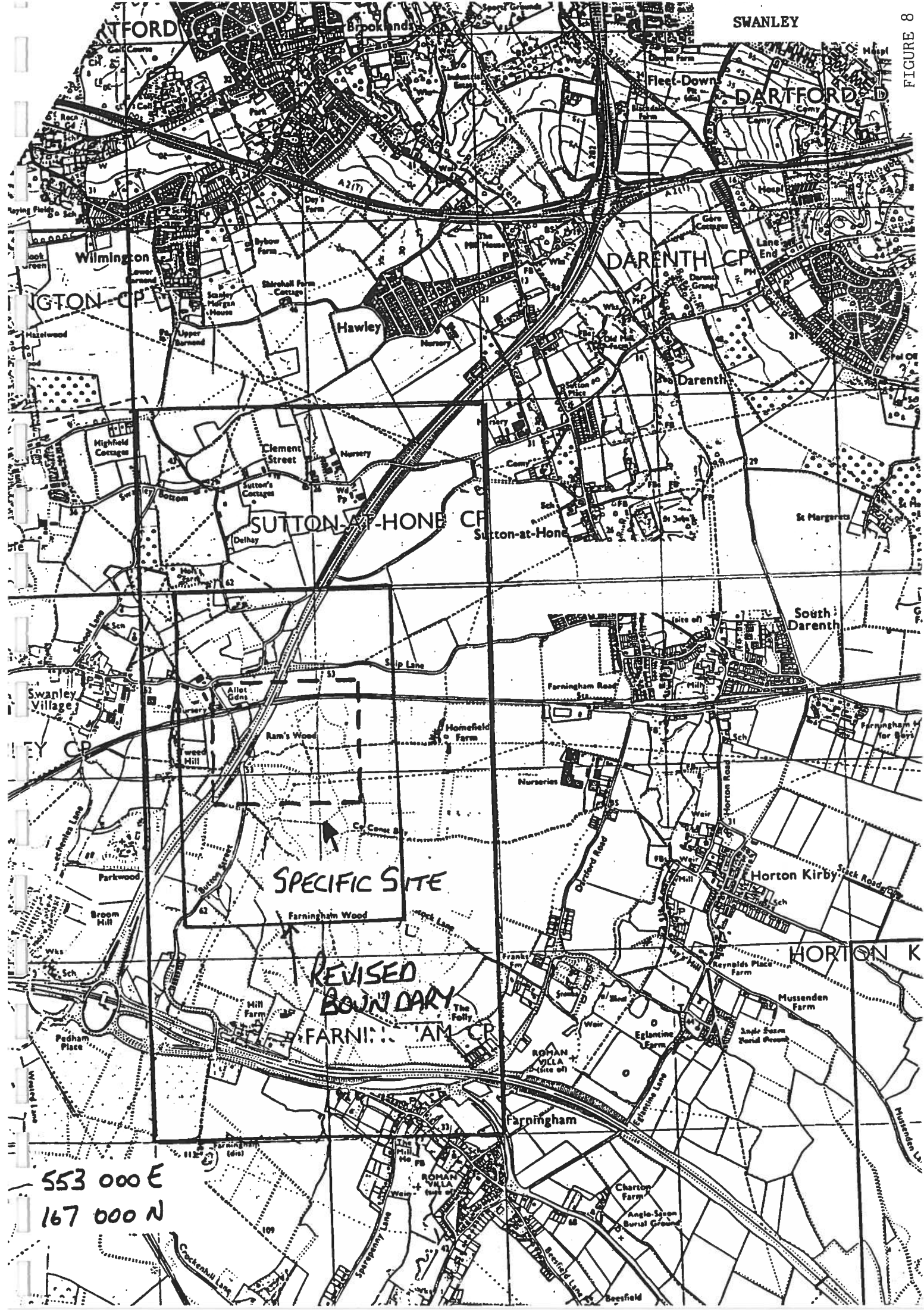
ASHEHAMPTON CP

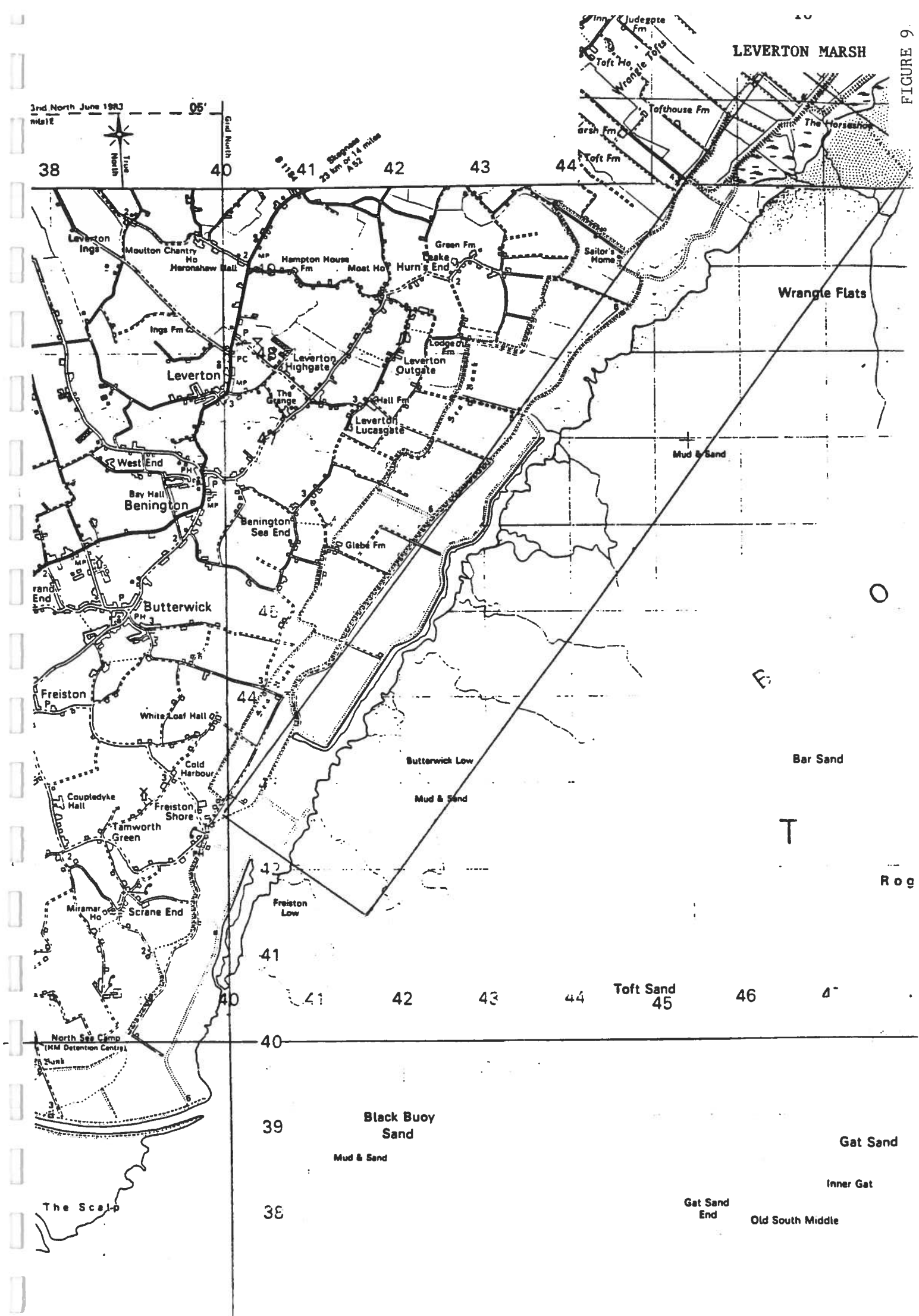
TINCLETON CP

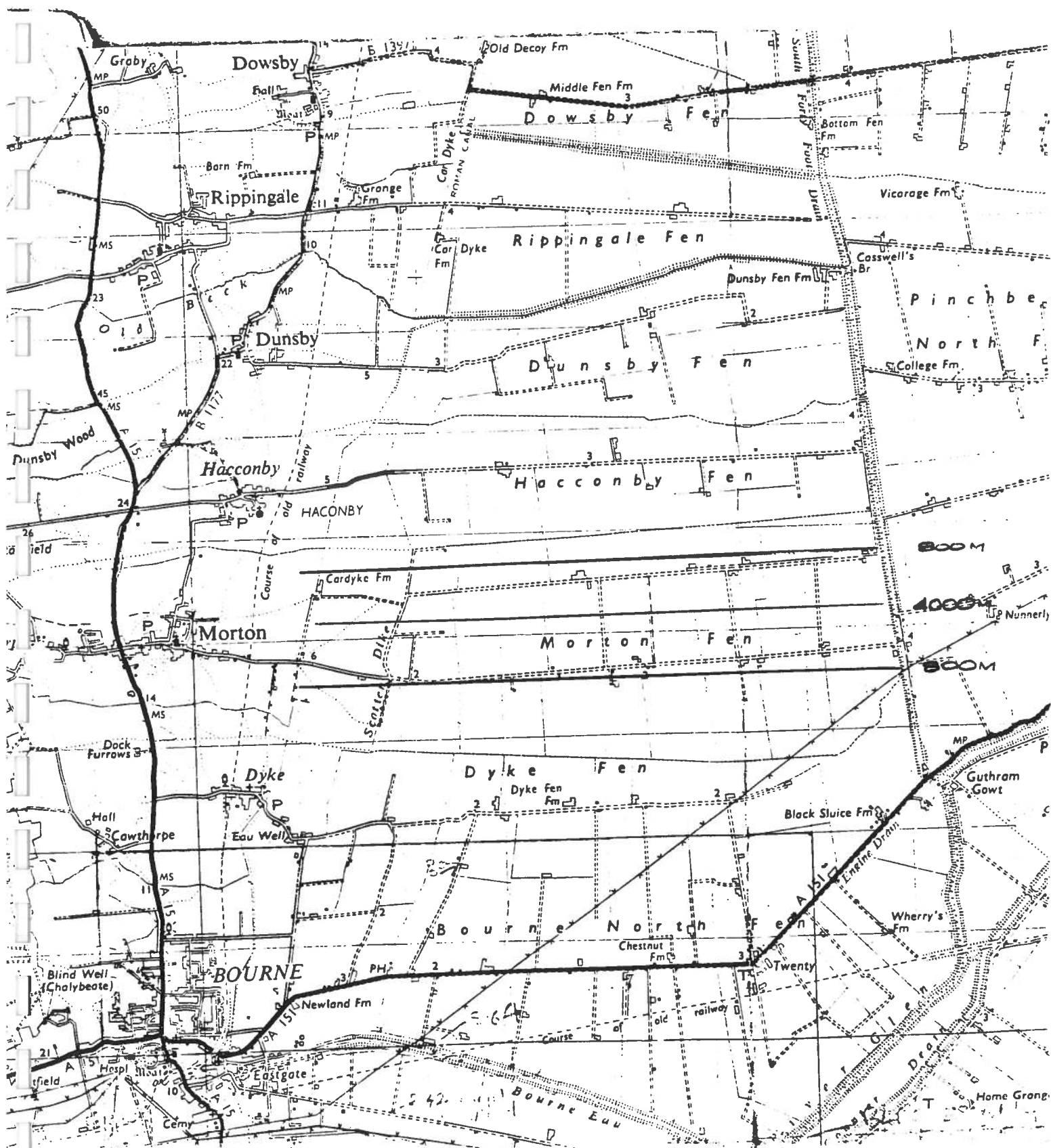
318000E
091000N

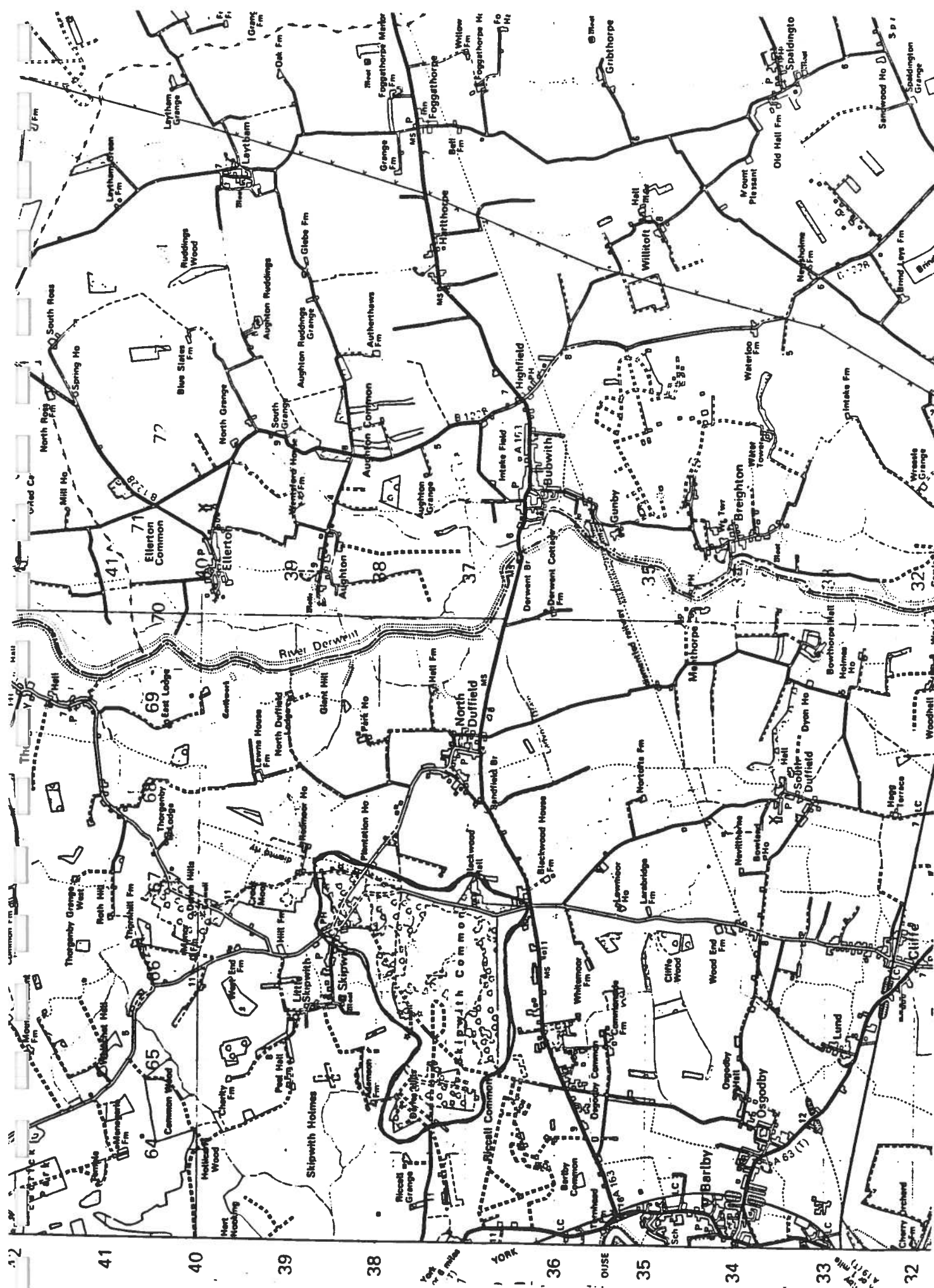
RELEASED
BOUNDARY



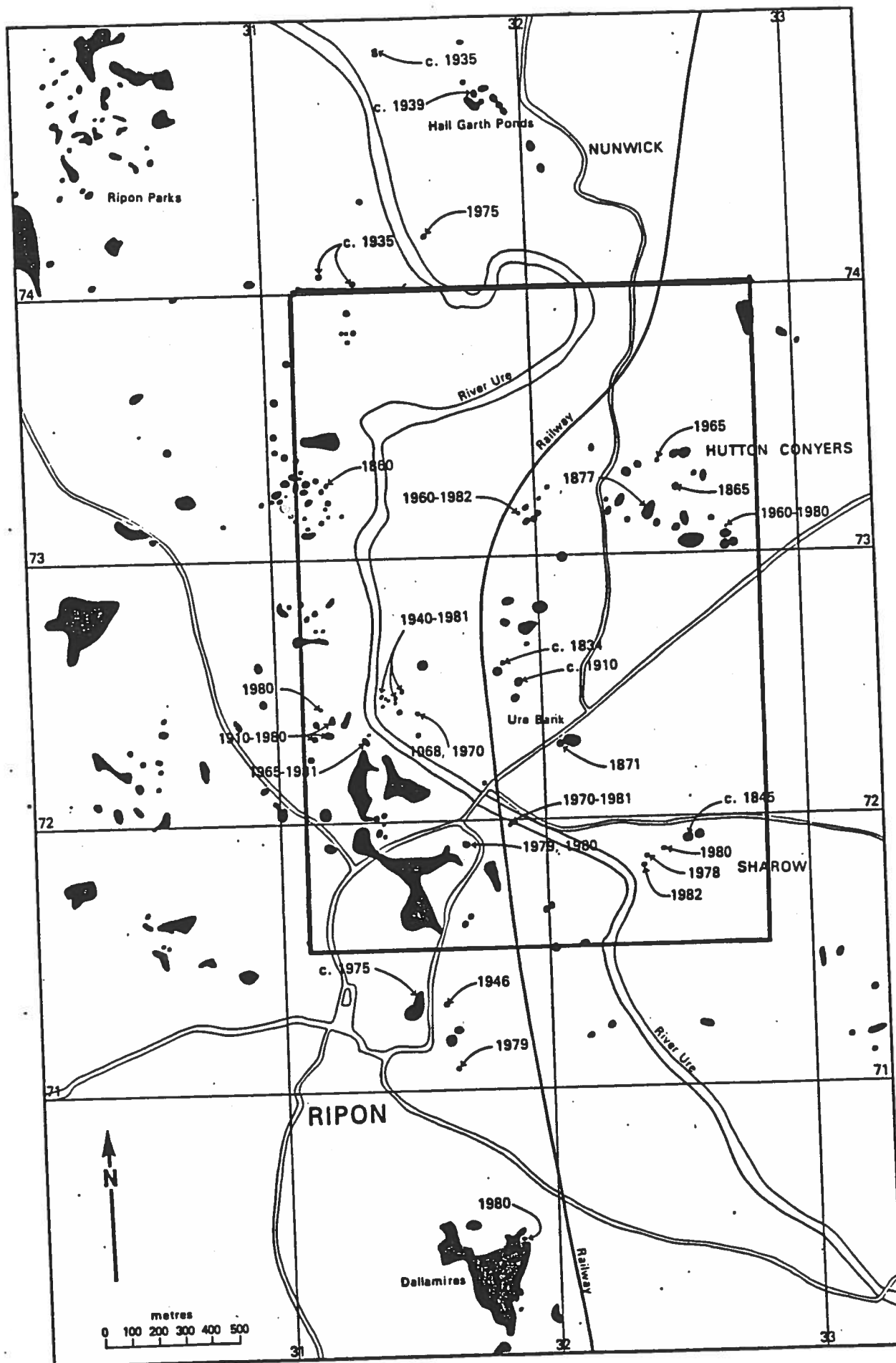








RIPON



1" KE 57R

1" = 1 mile with 1 km grid

Area for ATM cover, corner co-ords

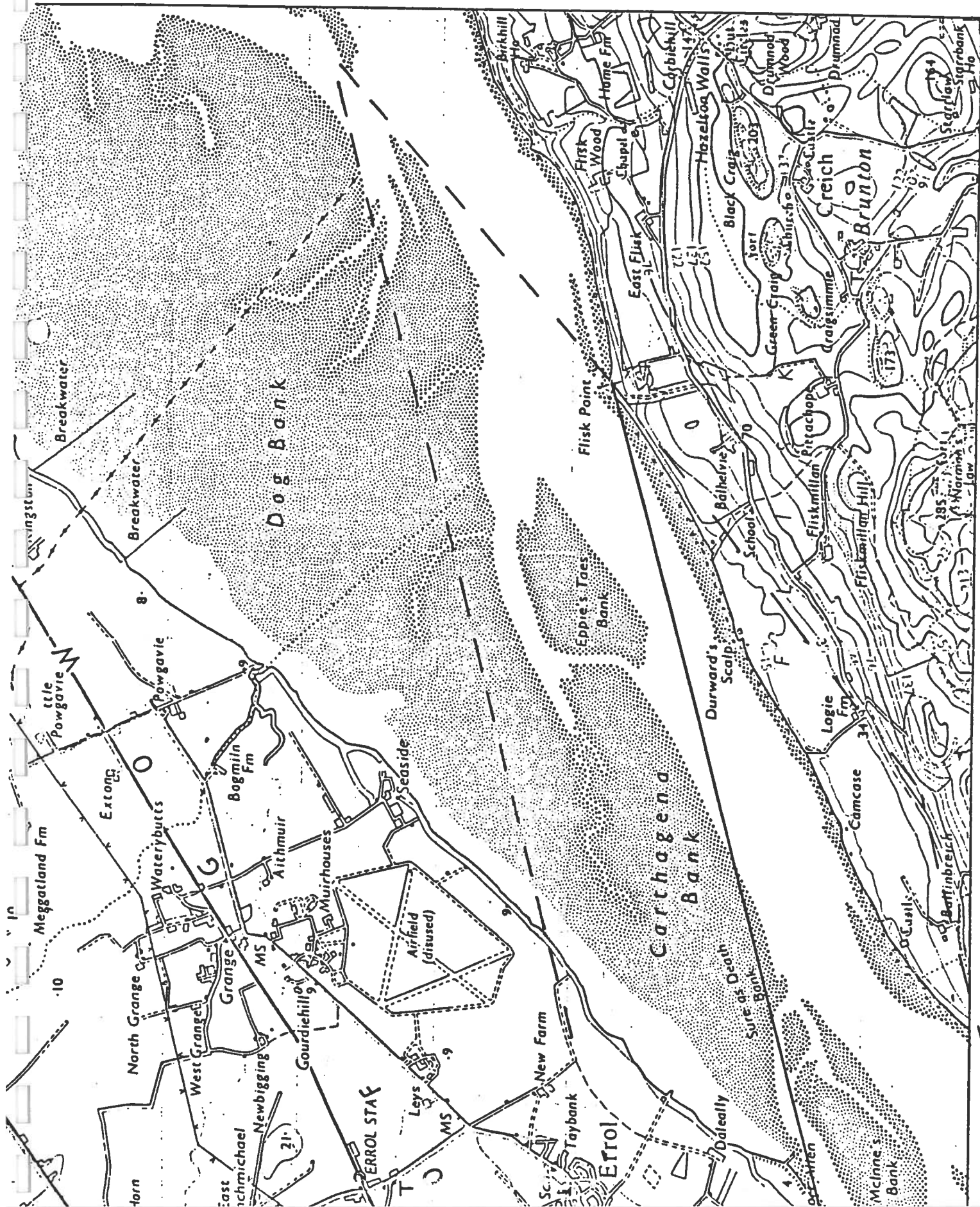
NY 15.21 29.21

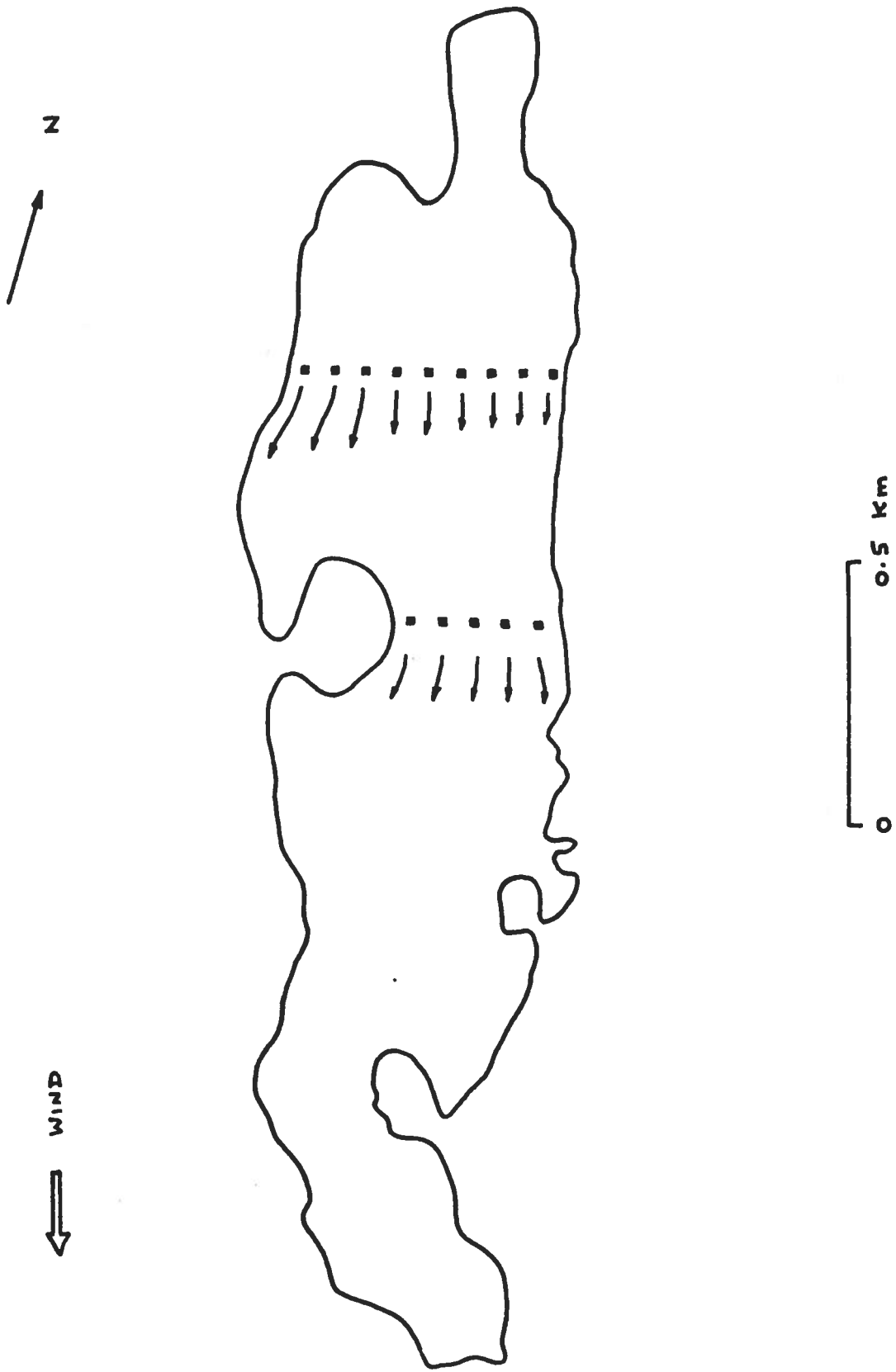
15.14 29.14

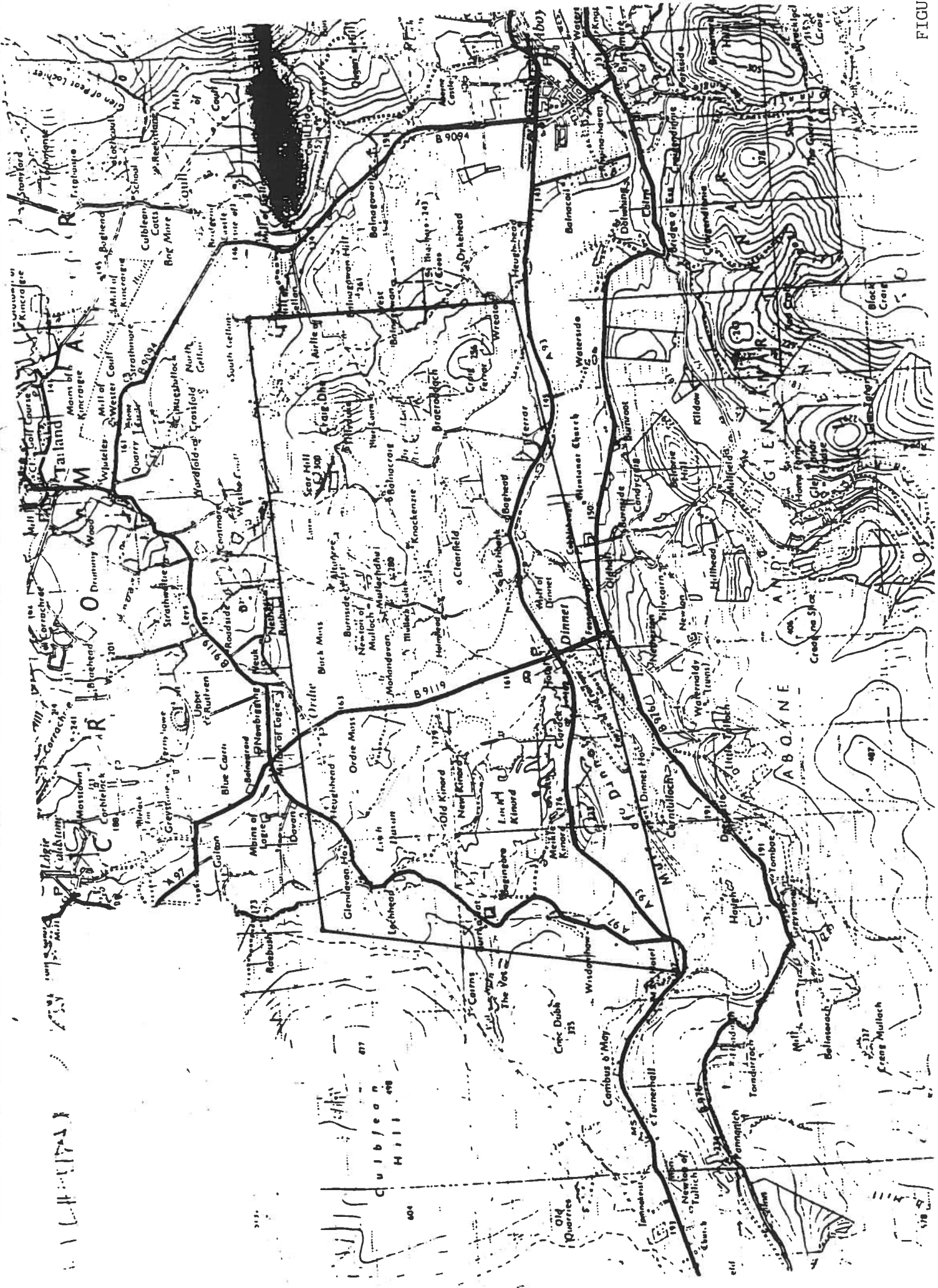


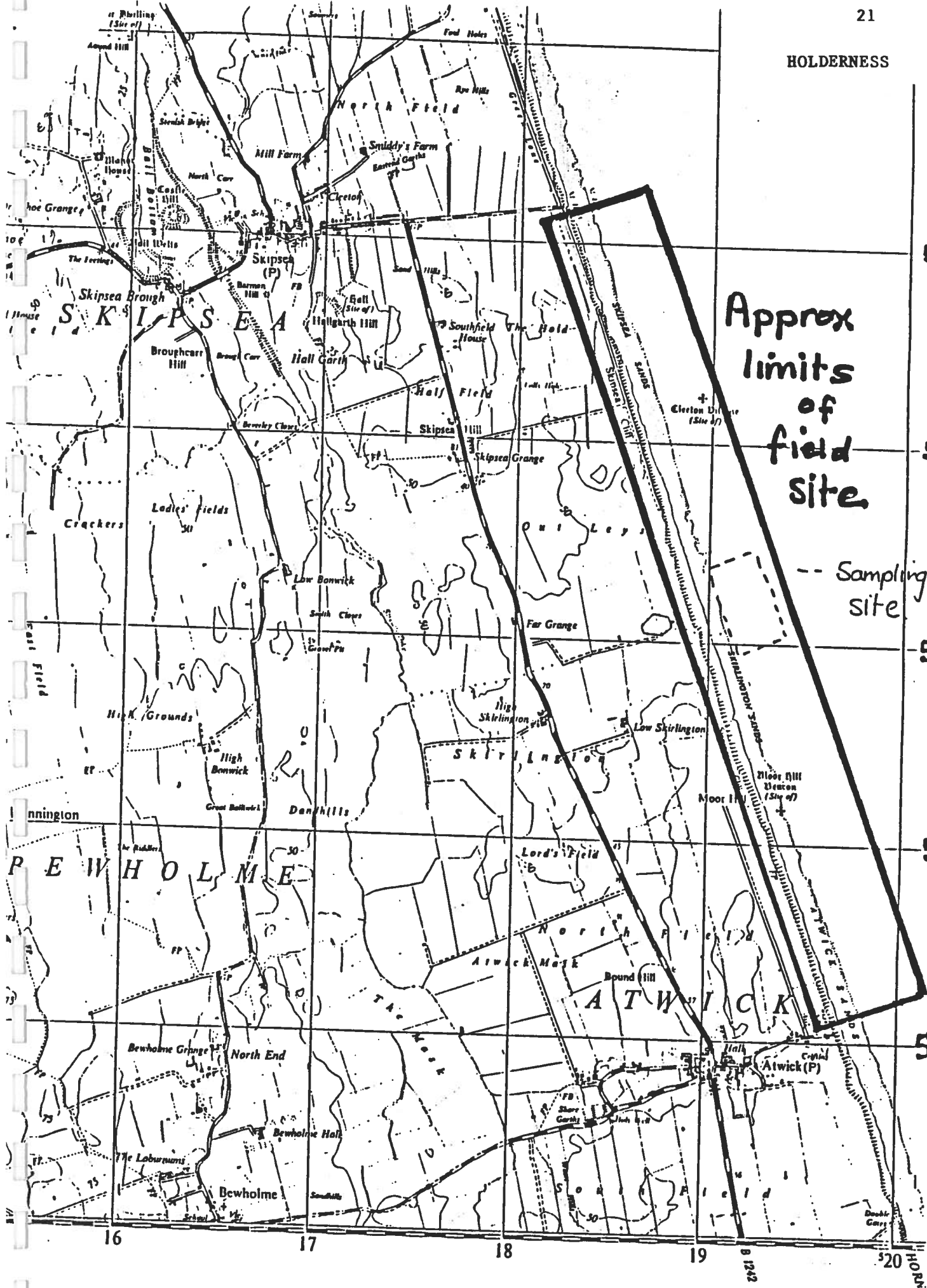
FIGURE 13

Lat
56° 25' N

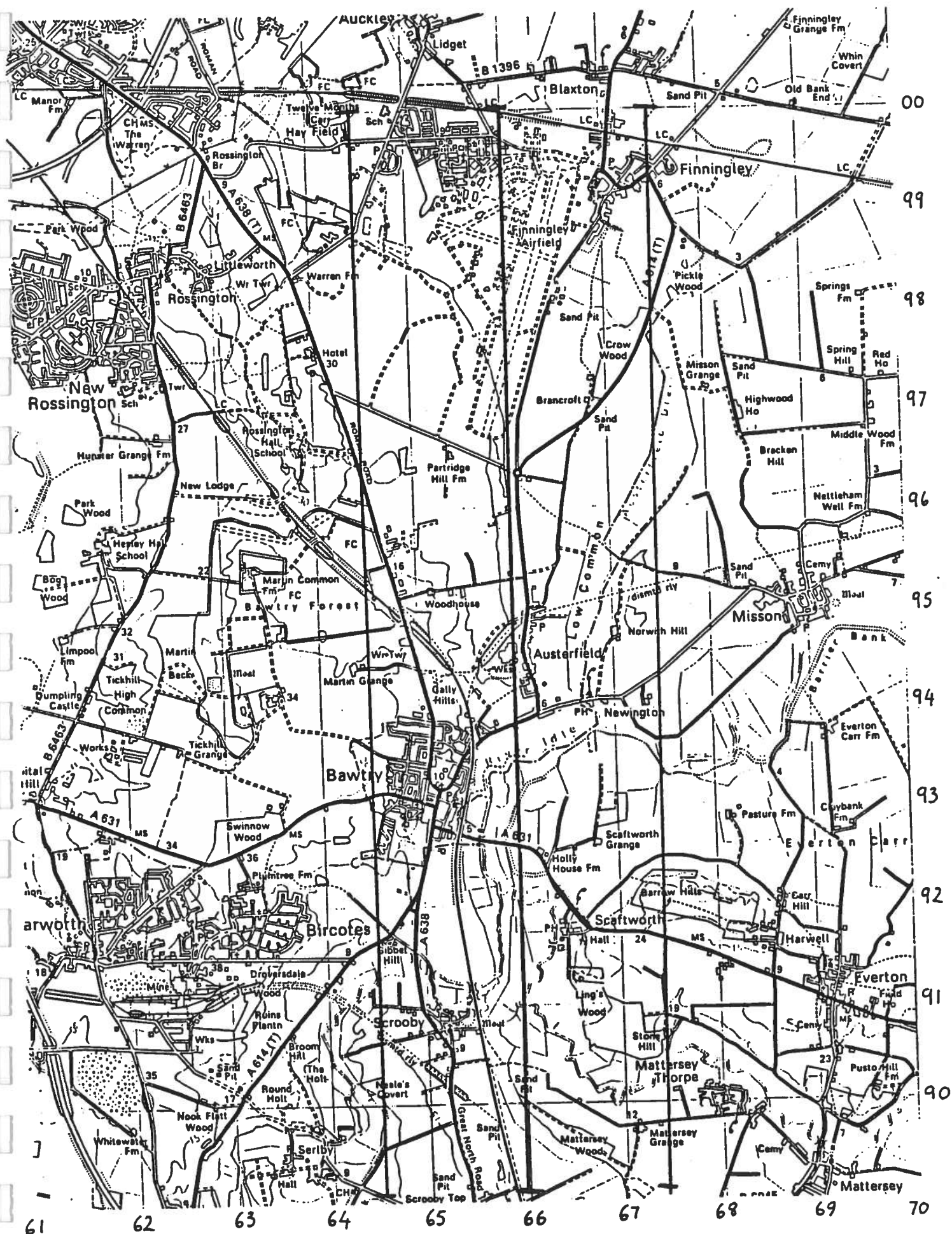




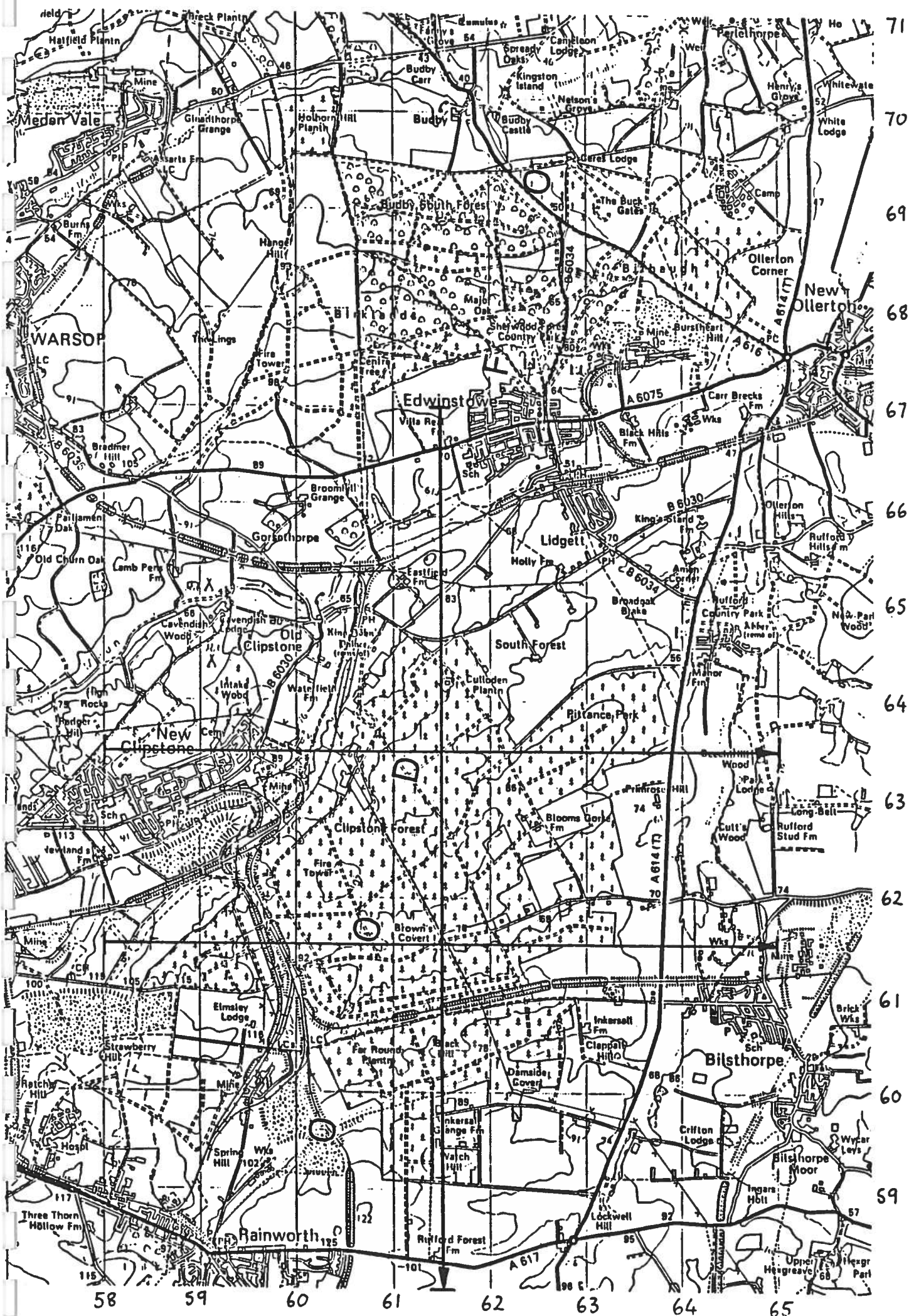




BAWTRY

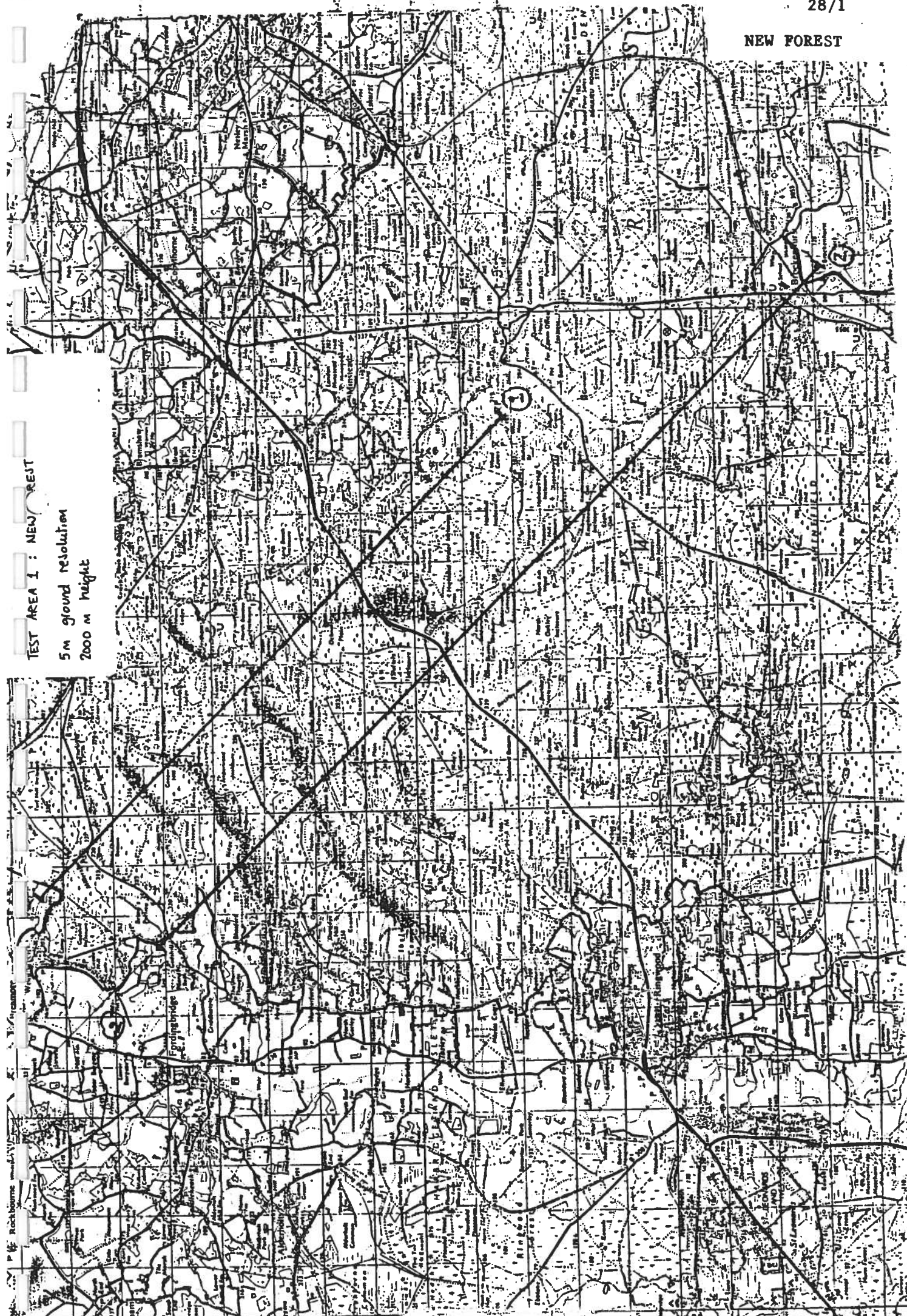


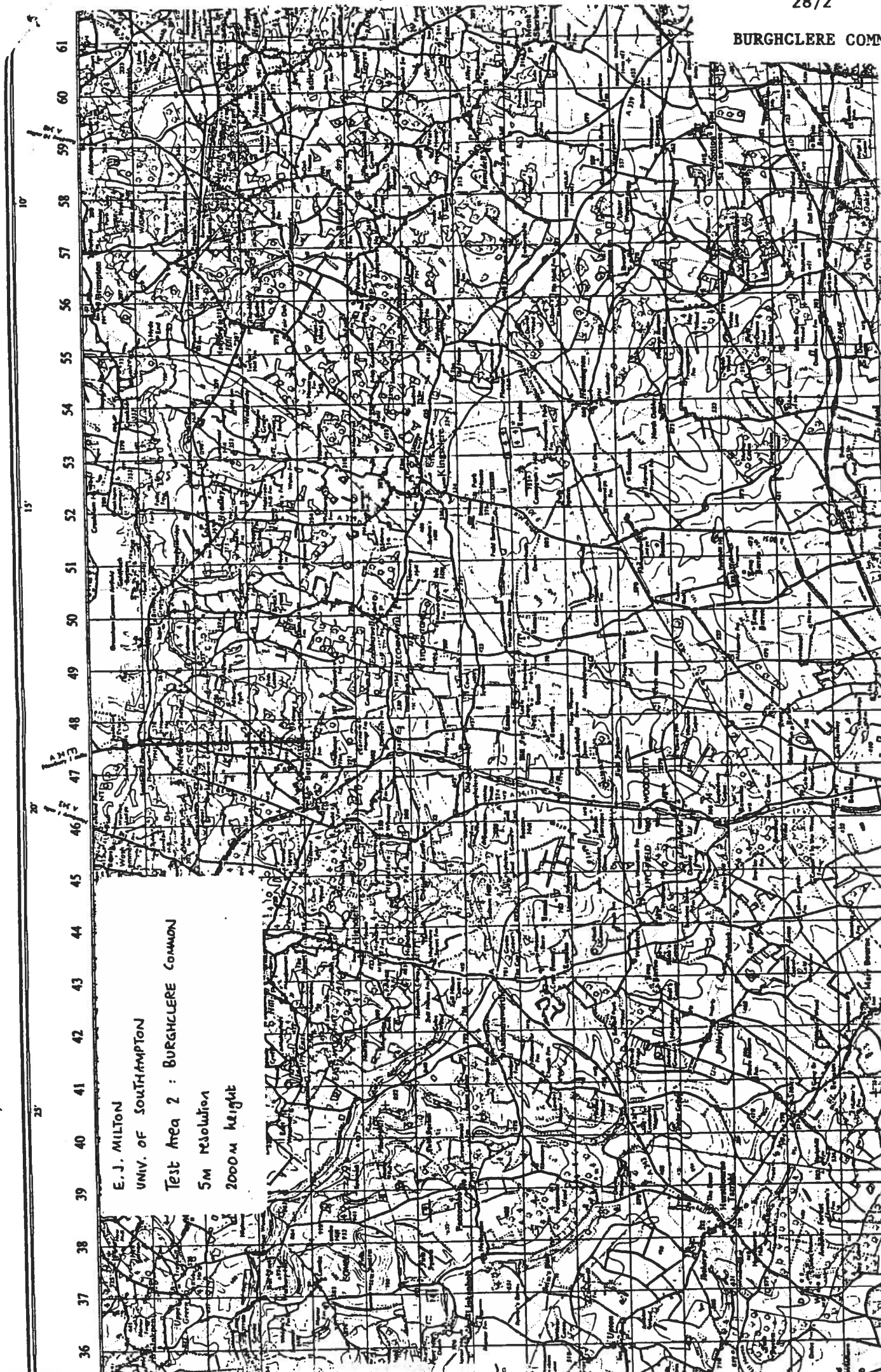
CLIPSTONE

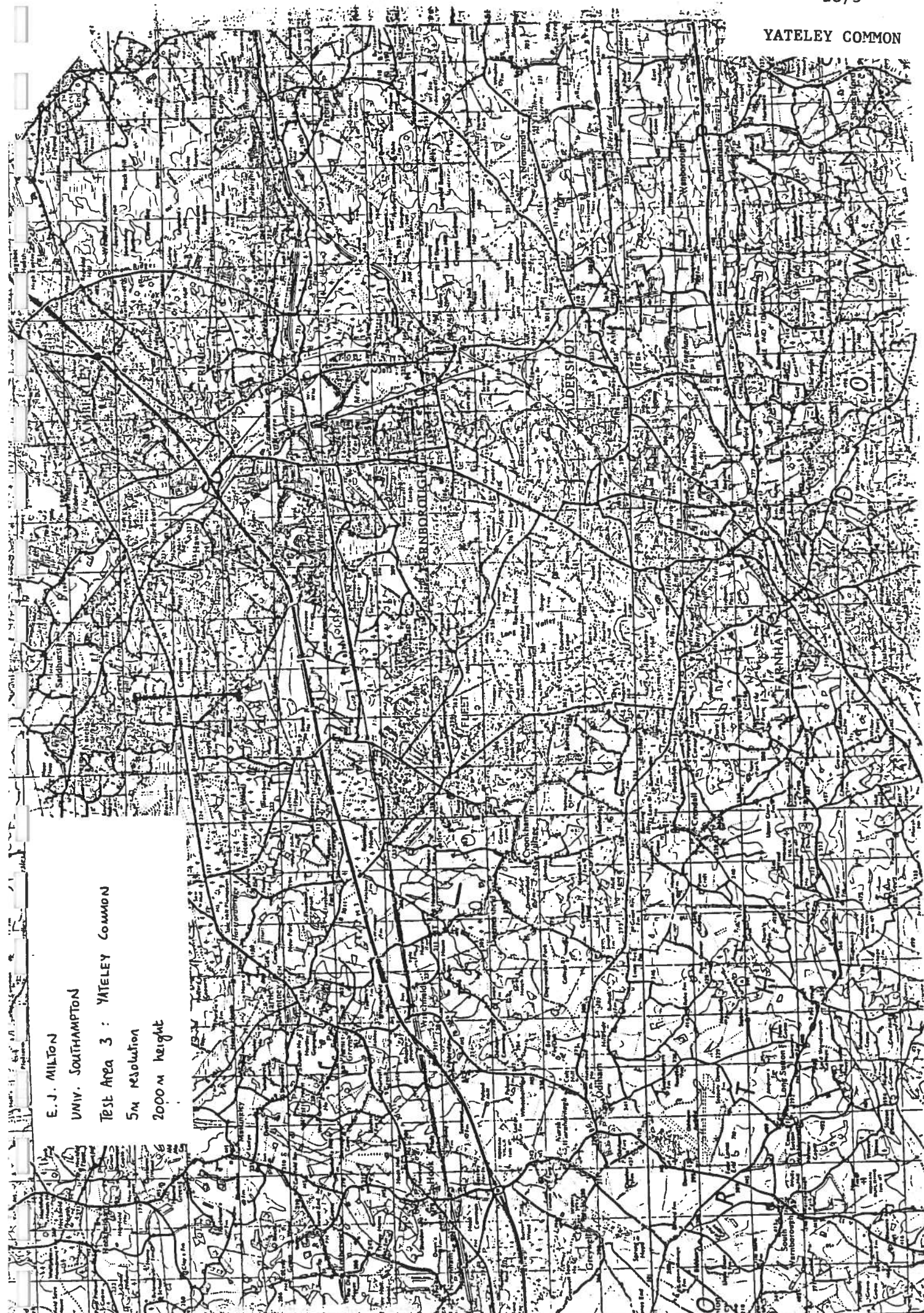


NEW FOREST

TEST AREA 1 : NEW FOREST

5m ground resolution
2000 m height





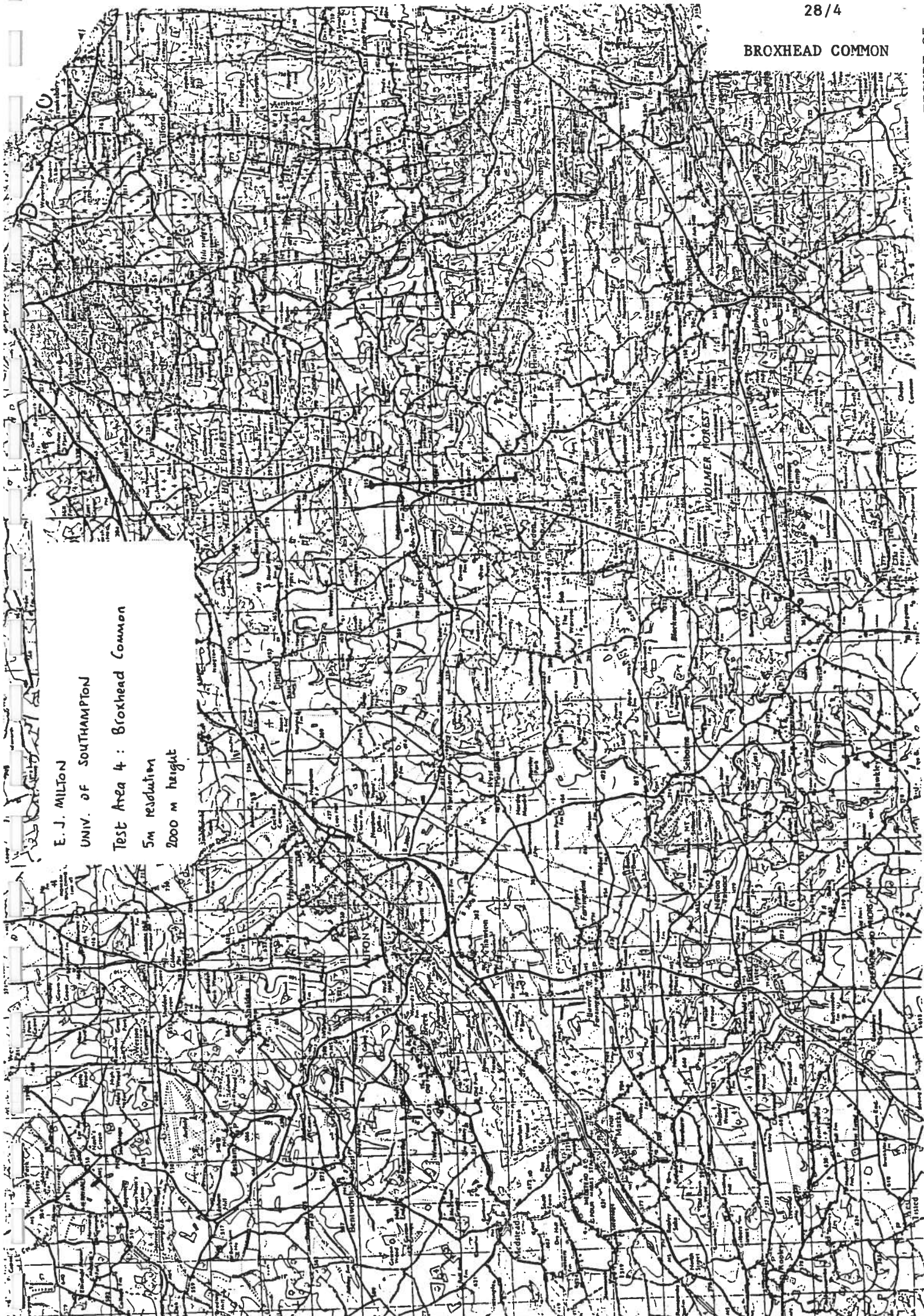
E. J. MILTON

UNIV. OF SOUTHAMPTON

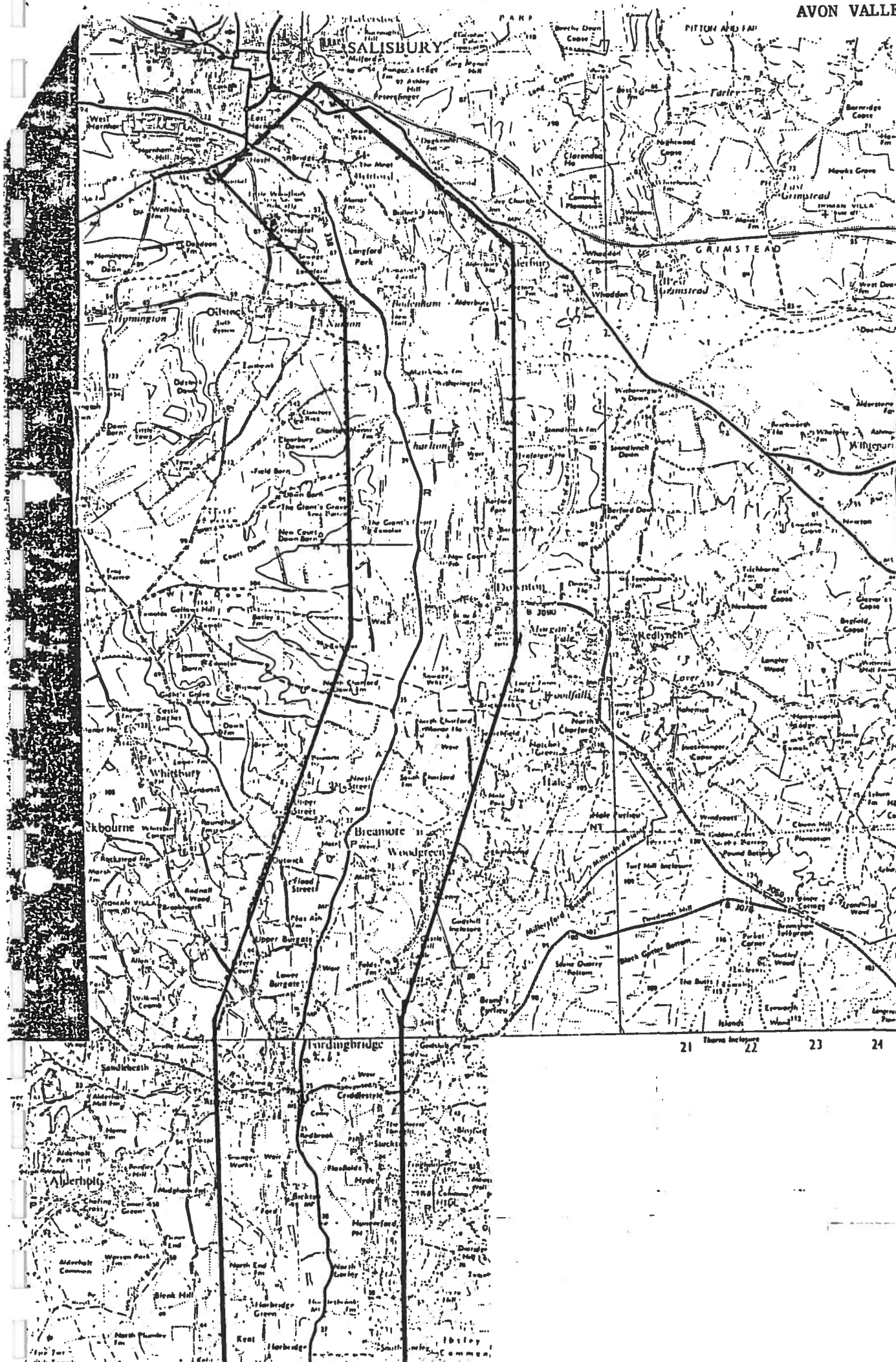
Test Area 4 : Broxhead Common

5m Resolution

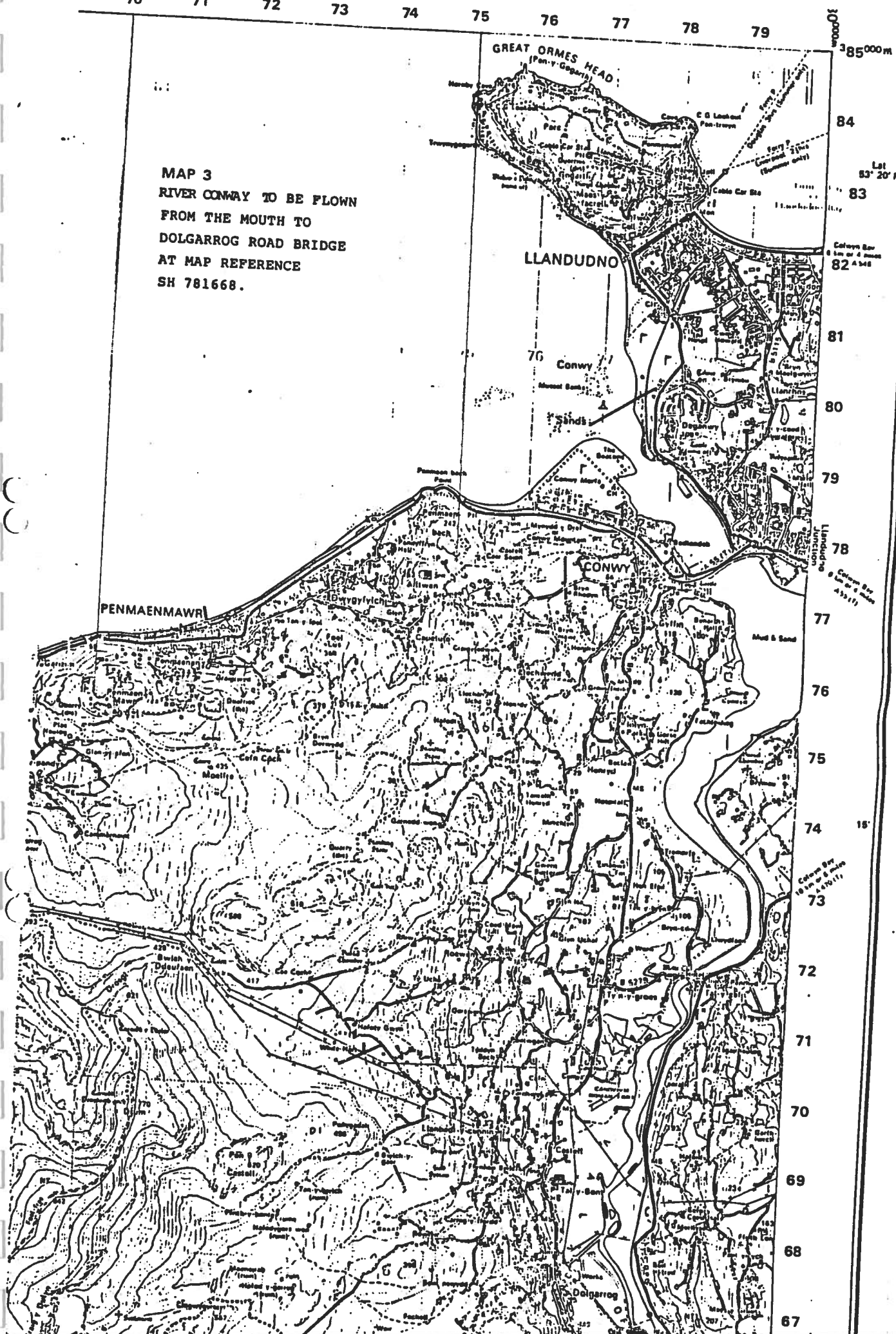
2000 m height



AVON VALLEY



MAP 3
RIVER CONWAY TO BE FLOWN
FROM THE MOUTH TO
DOLGARROG ROAD BRIDGE
AT MAP REFERENCE
SH 781668.

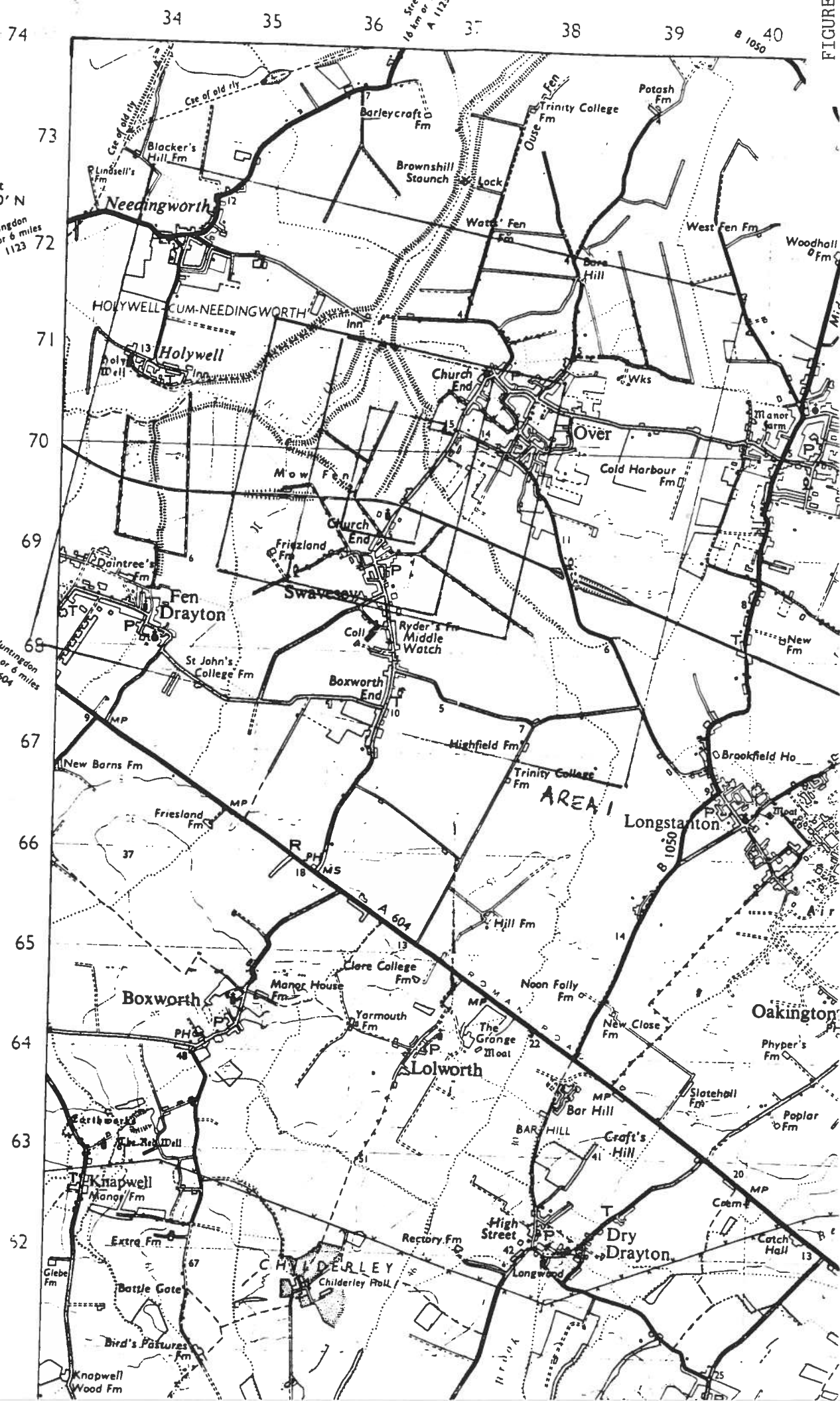


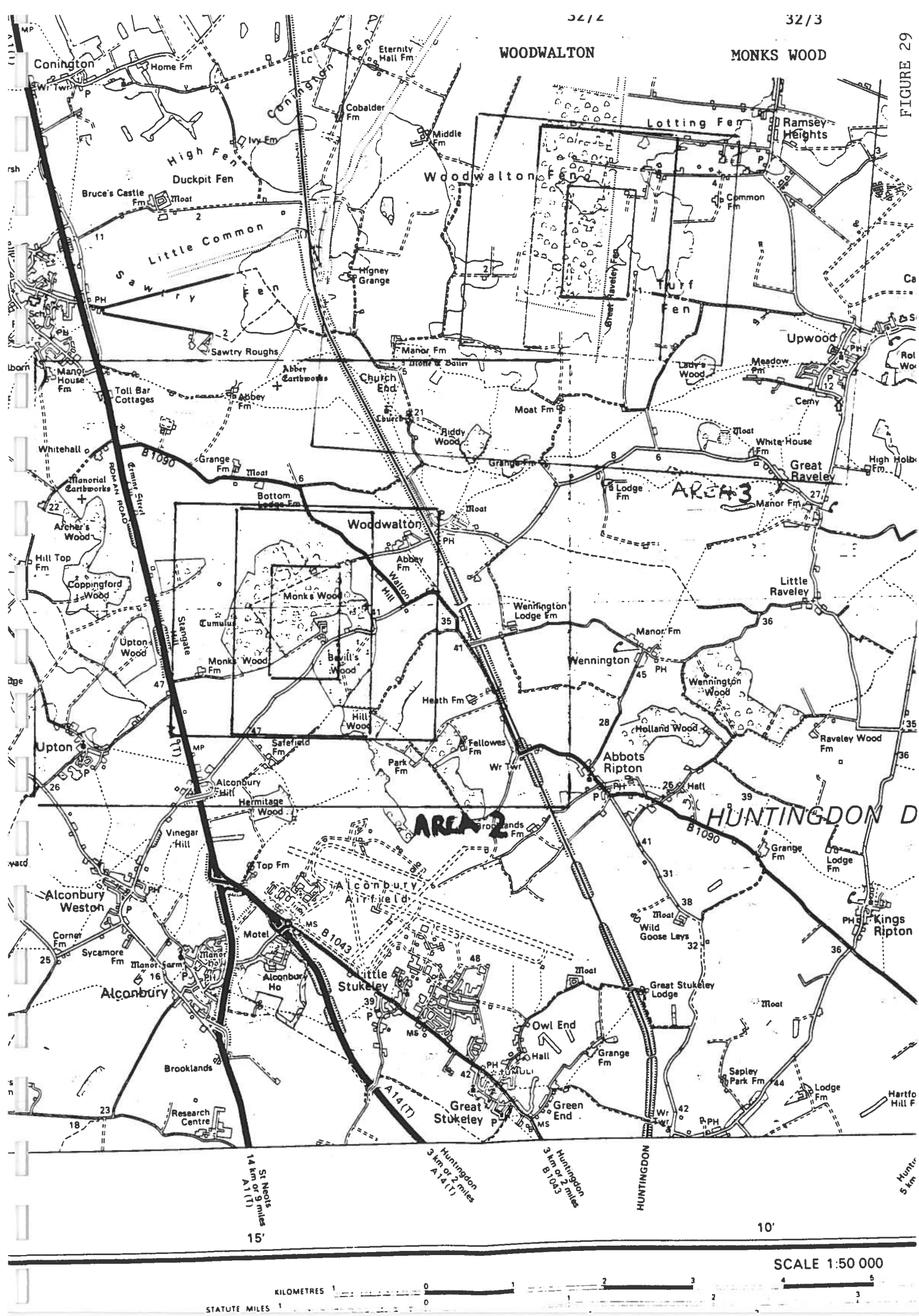
SWAVESEY FEN

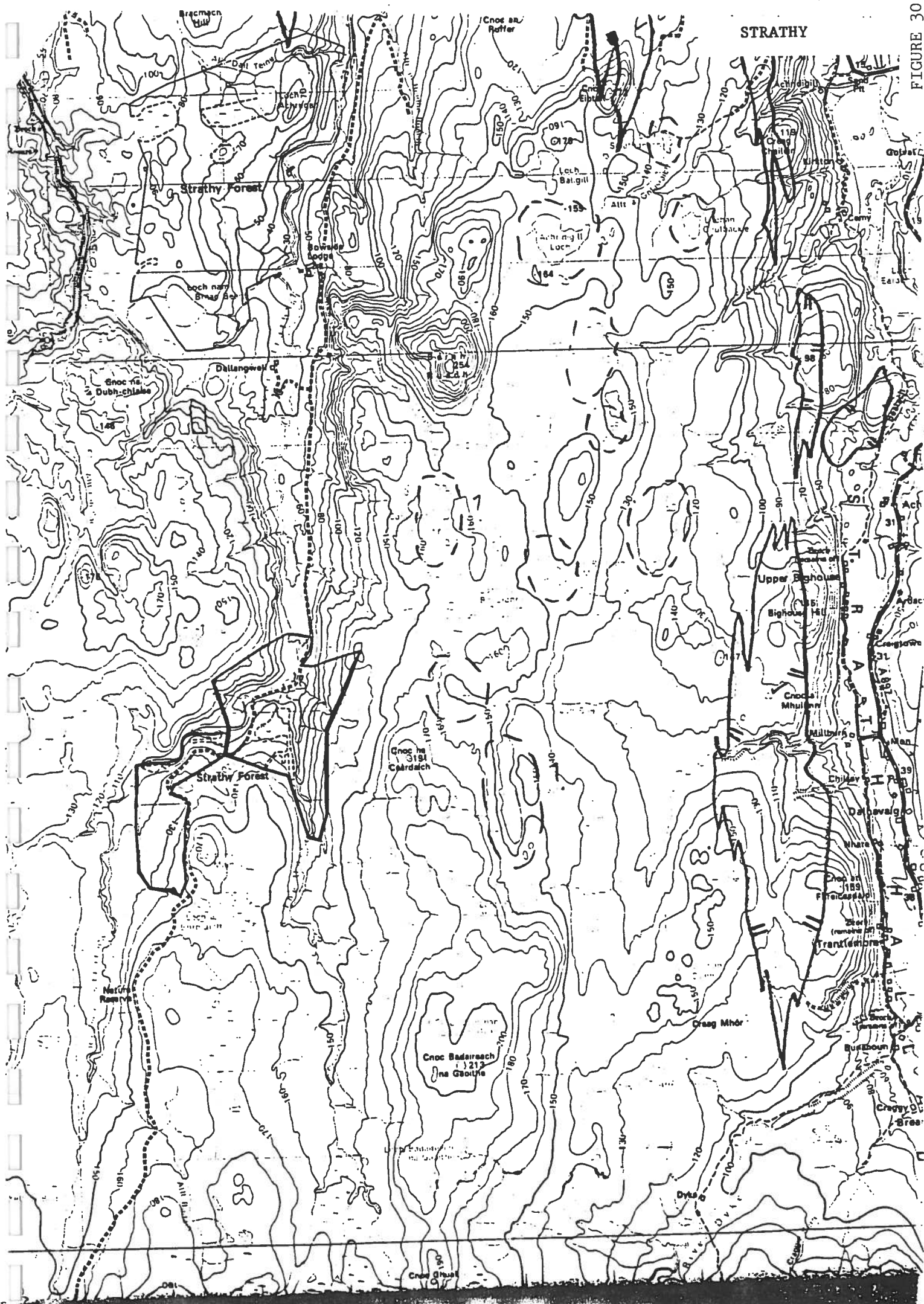
Lat
52° 20' N
Huntingdon
10 km or 6 miles
A 1123

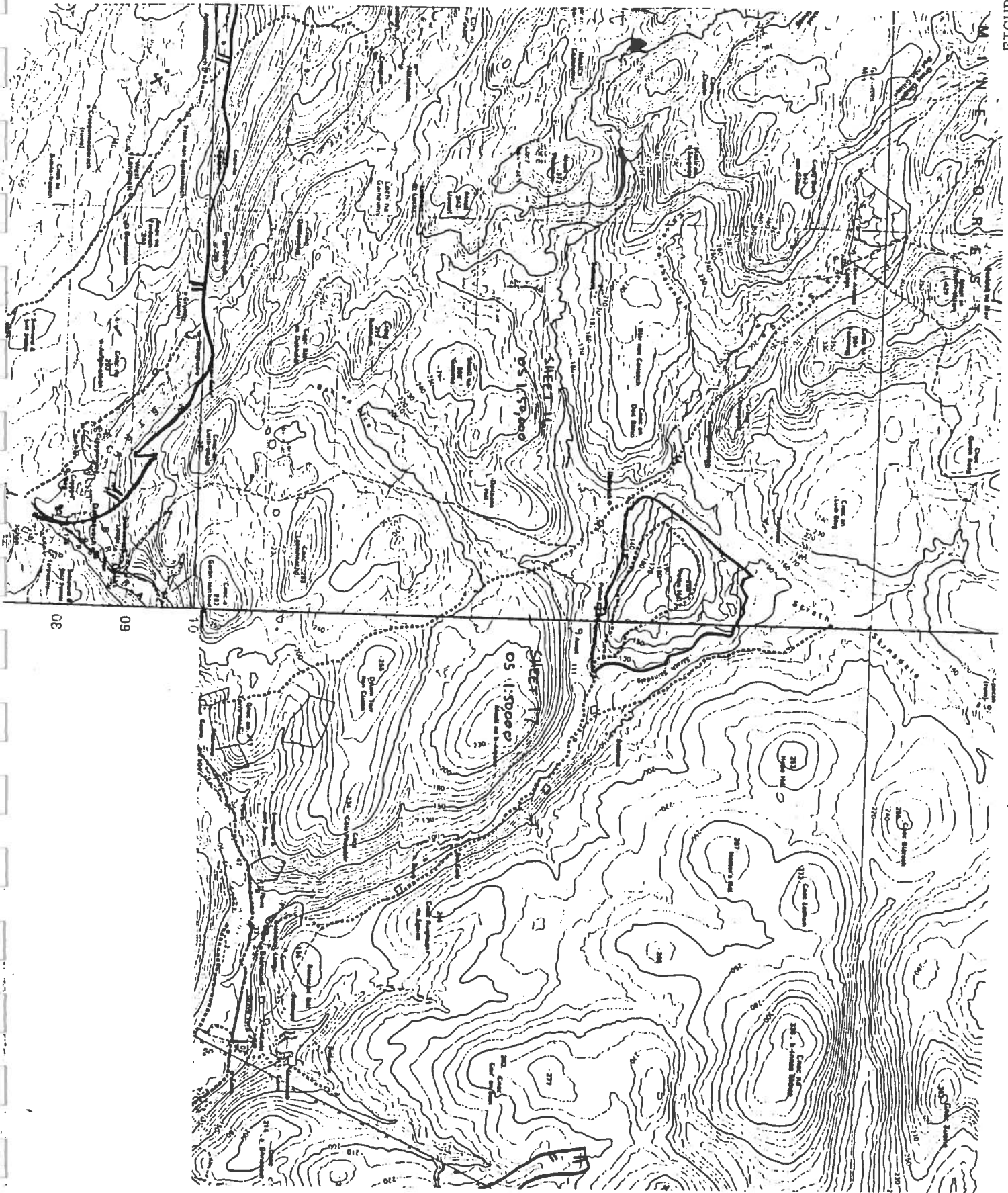
Huntingdon
11 km or 6 miles
A 604

15'





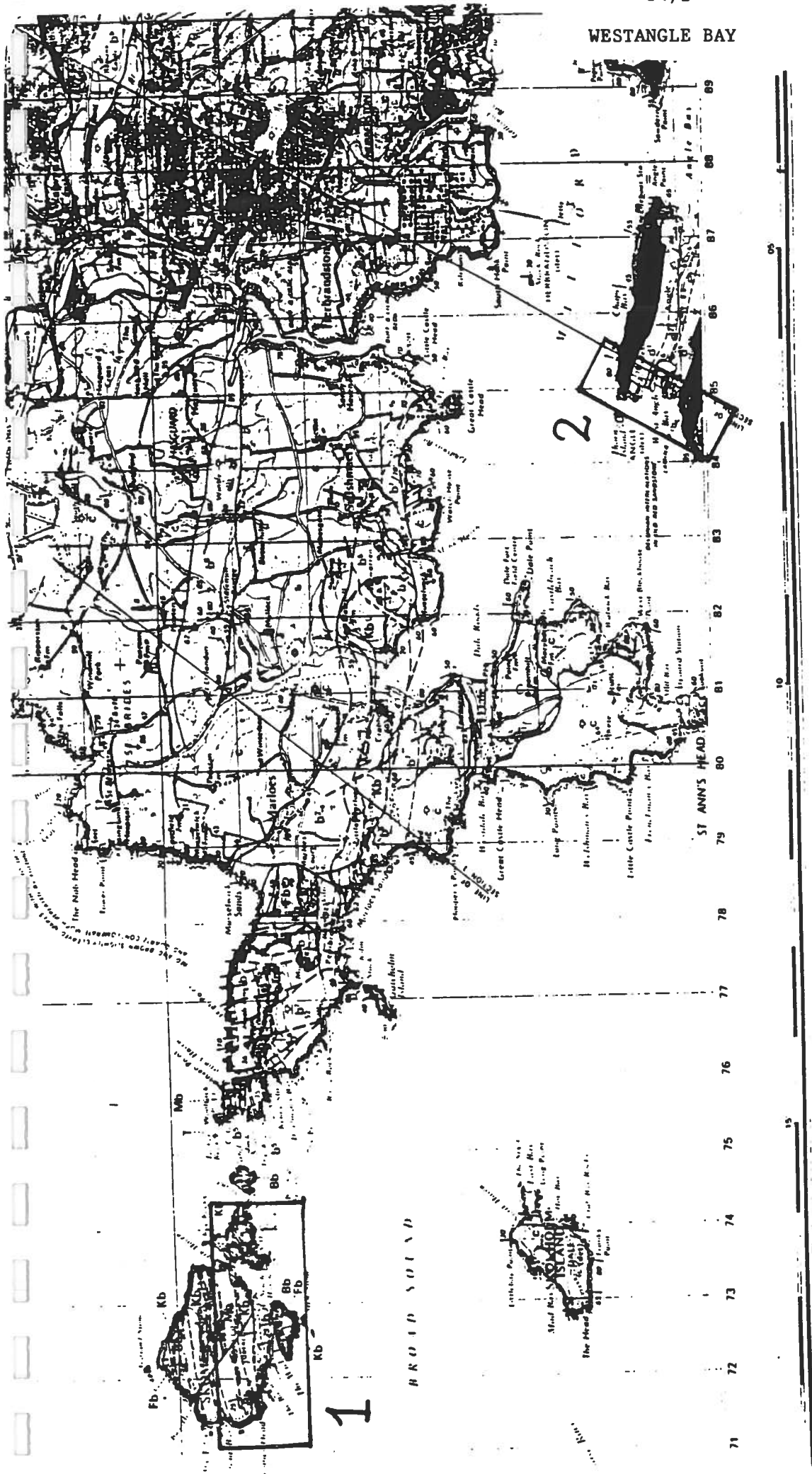






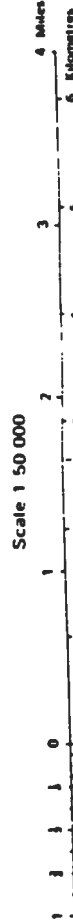
WESTANGLE BAY

SKOMER ISLAND



Index to the Six Inch Maps on this Sheet

20	21	22
23	24	25
26	27	28
29	30	31
32	33	34
35	36	37
38	39	40



Notes of the adjoining Contingent Sheets

209	210
220	221
222	223
224	225

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SECTIONS SHOWING THE GENERAL RELATIONS OF THE ROCKS ALONG THE LINES DRAWN ON THE MAP

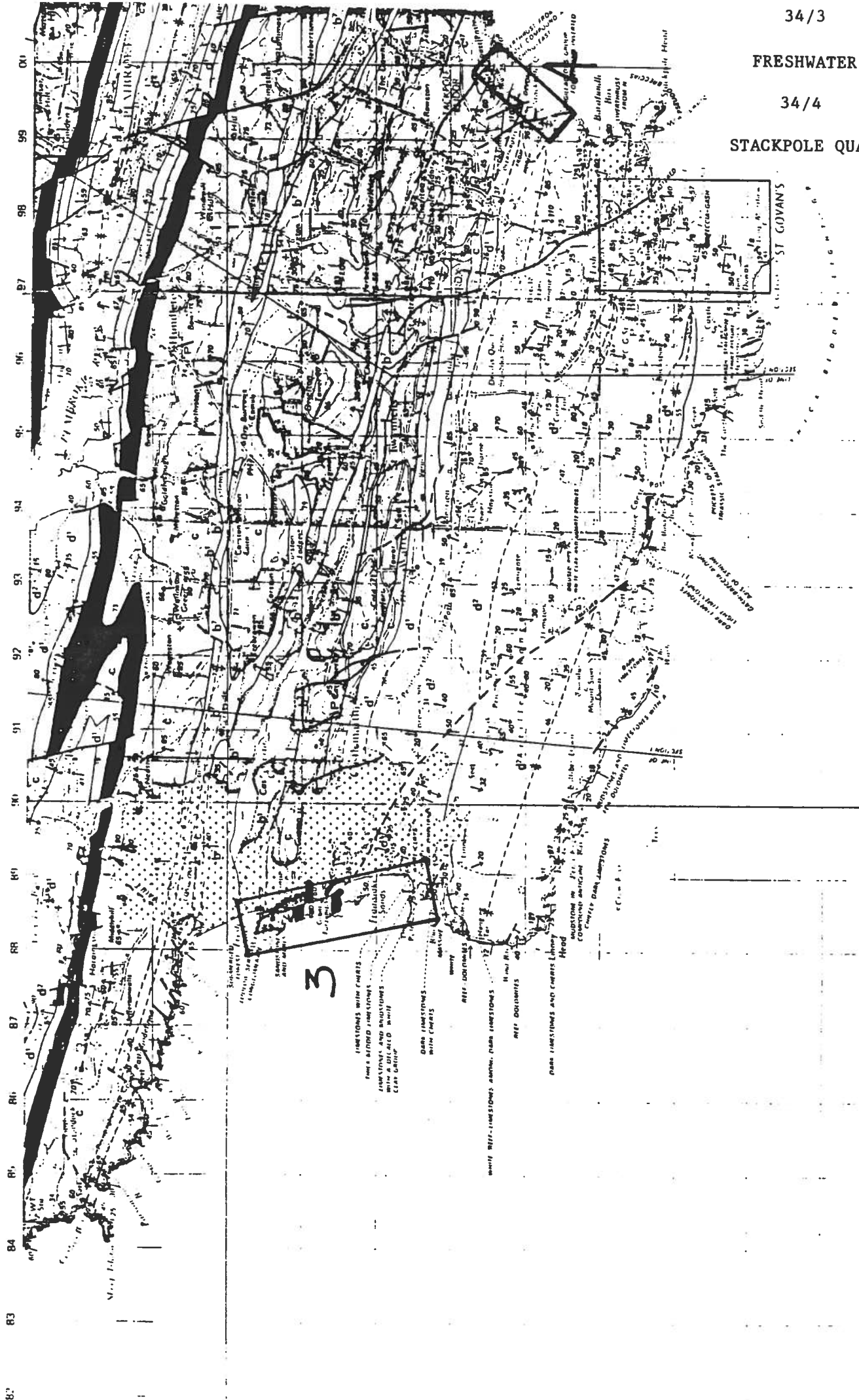
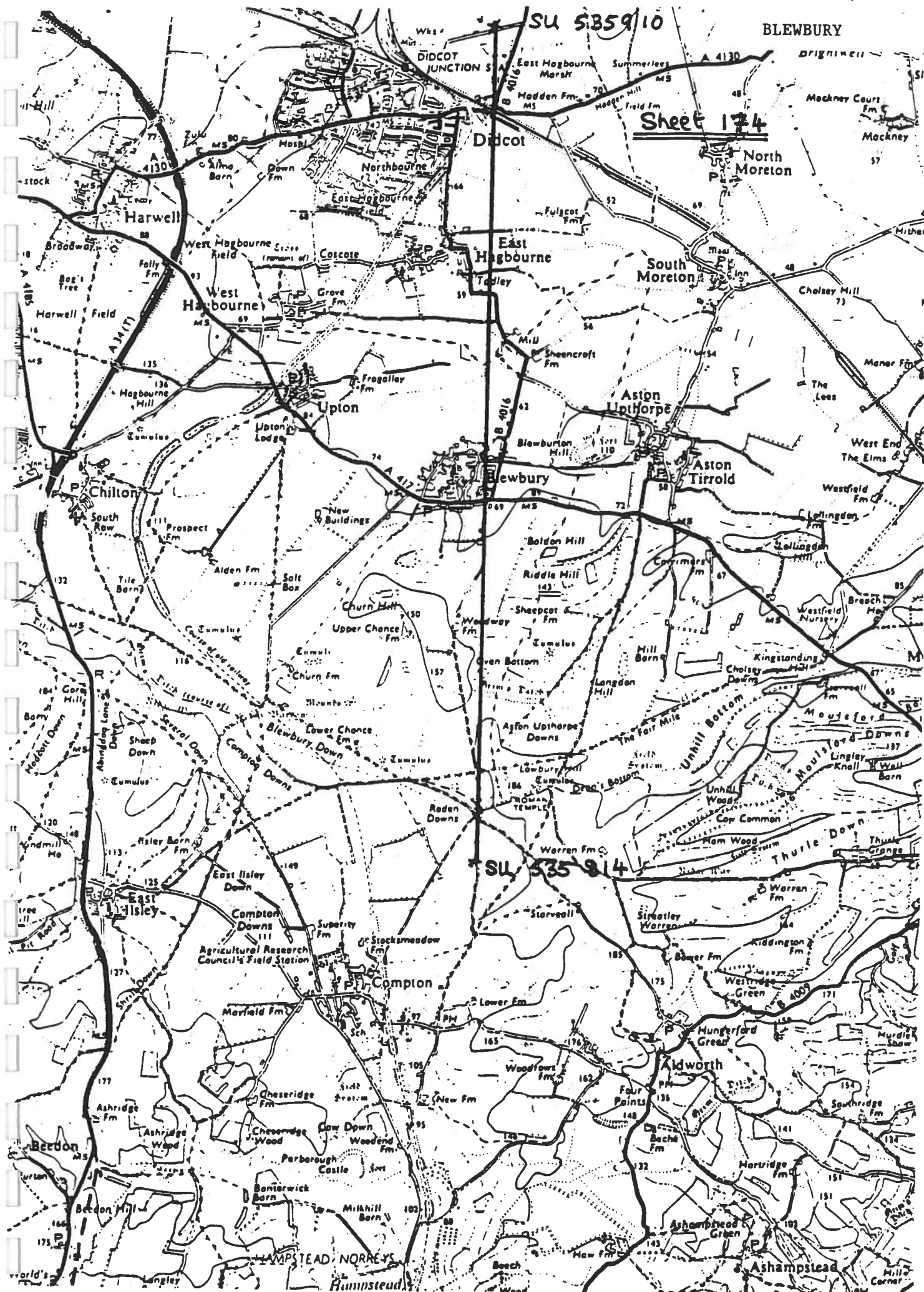
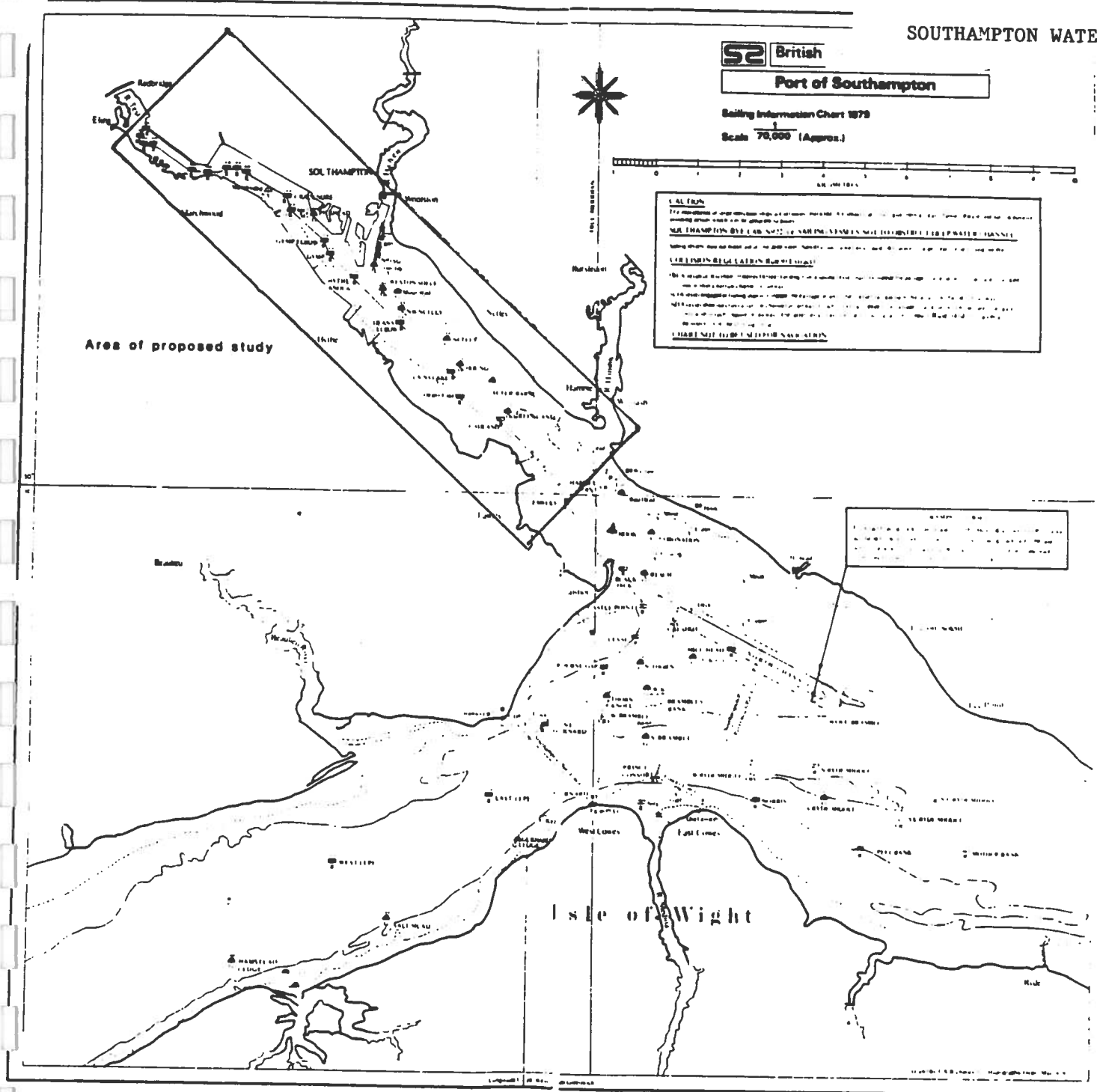


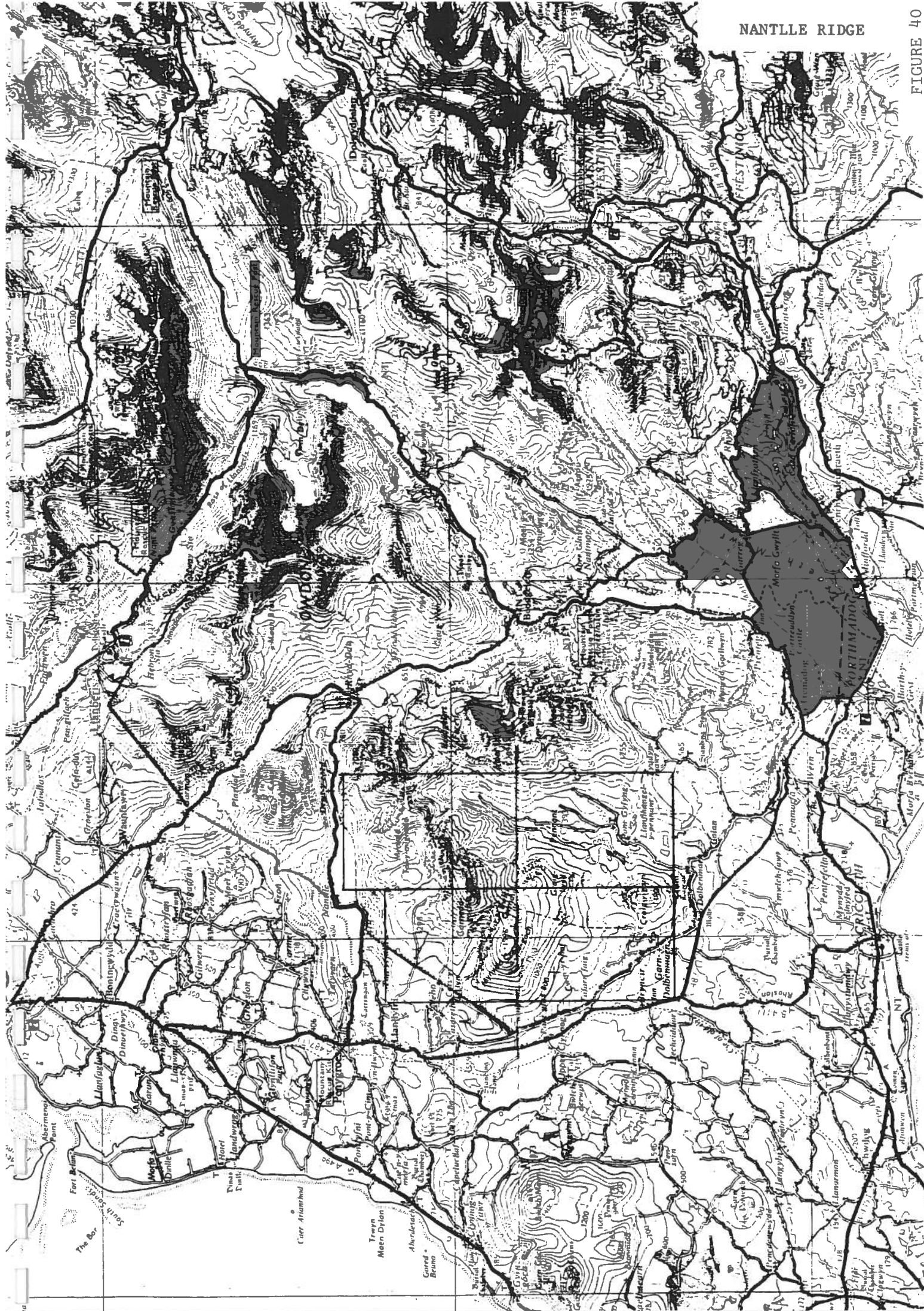


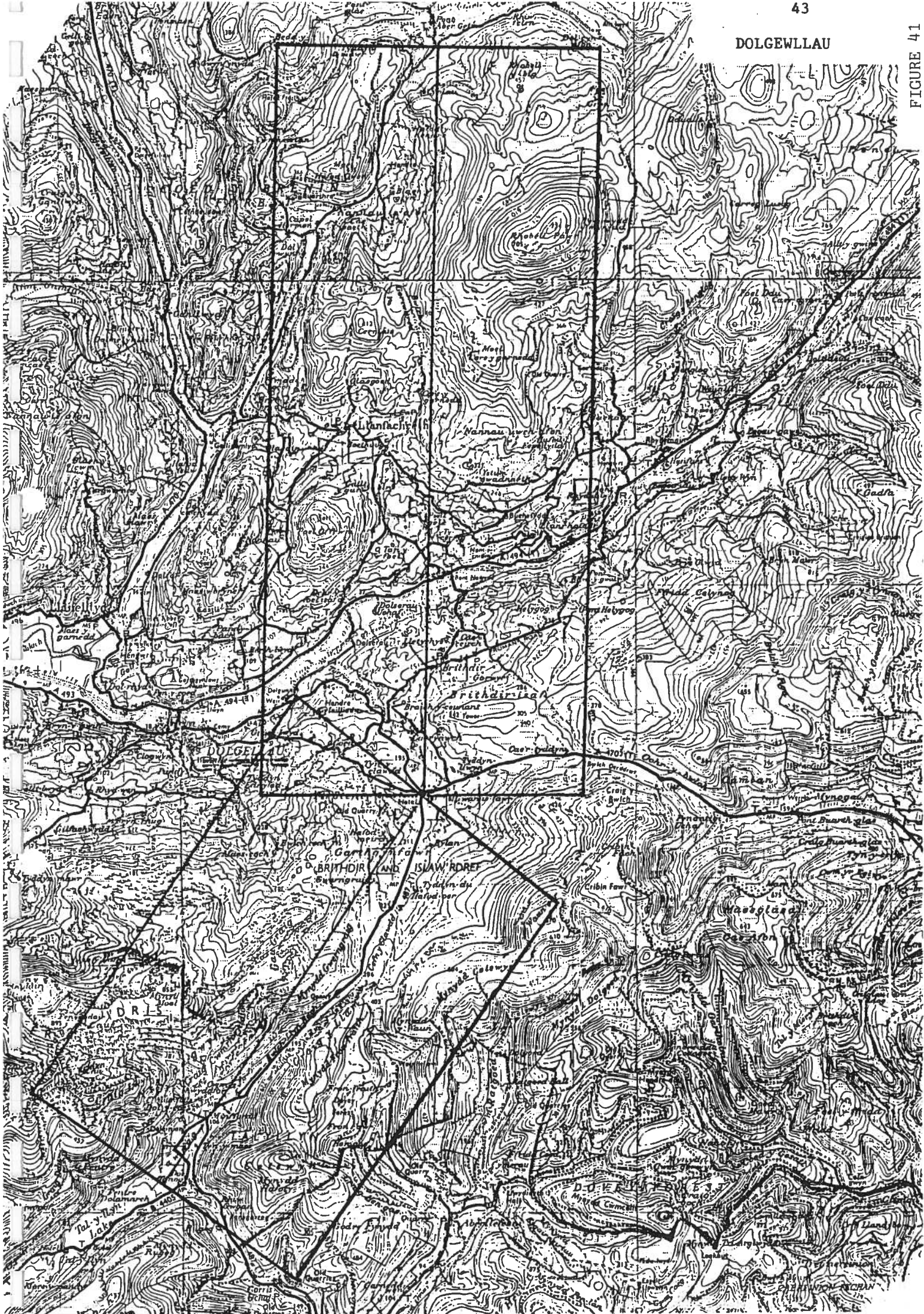
FIGURE 37



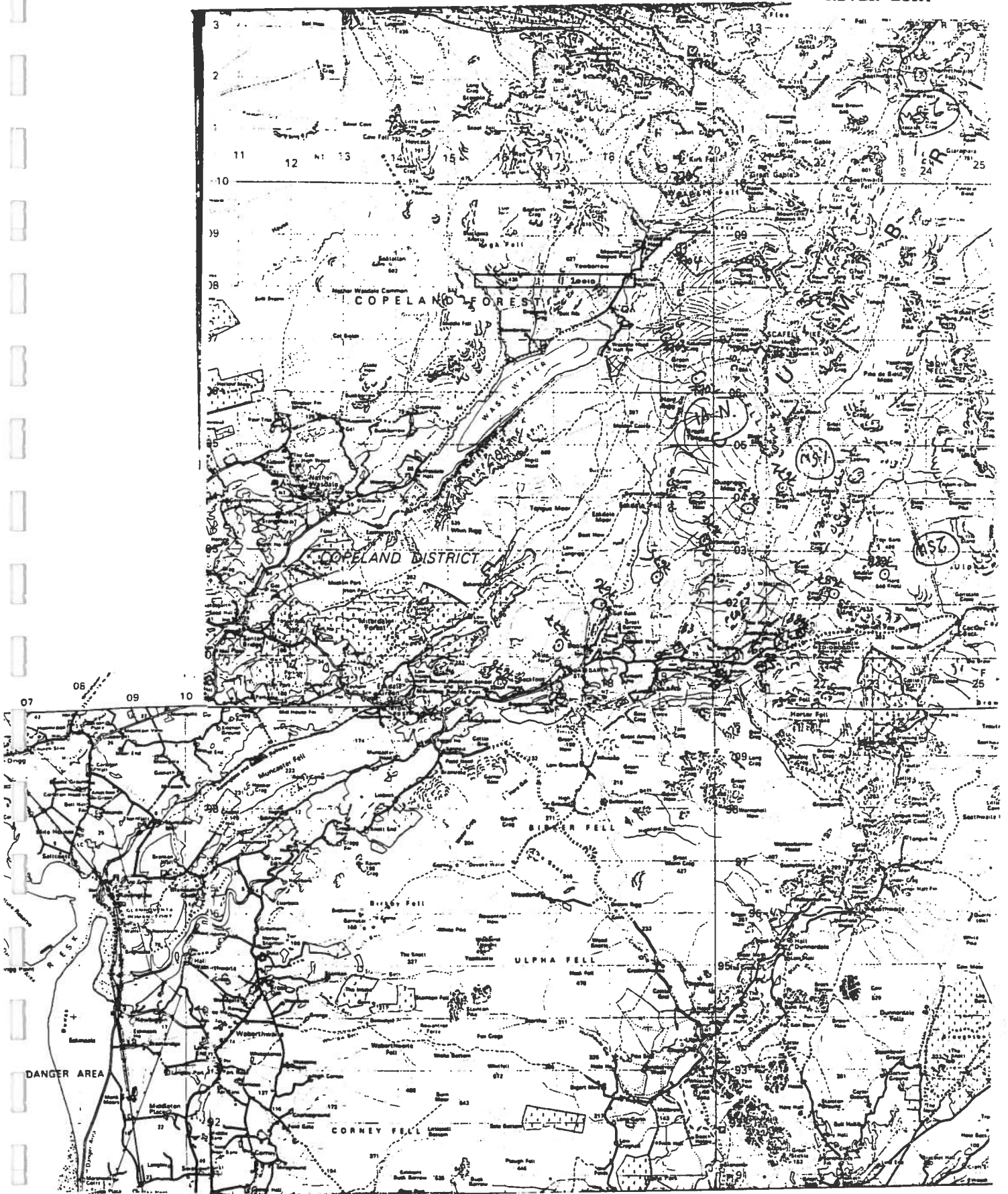
SOUTHAMPTON WATER

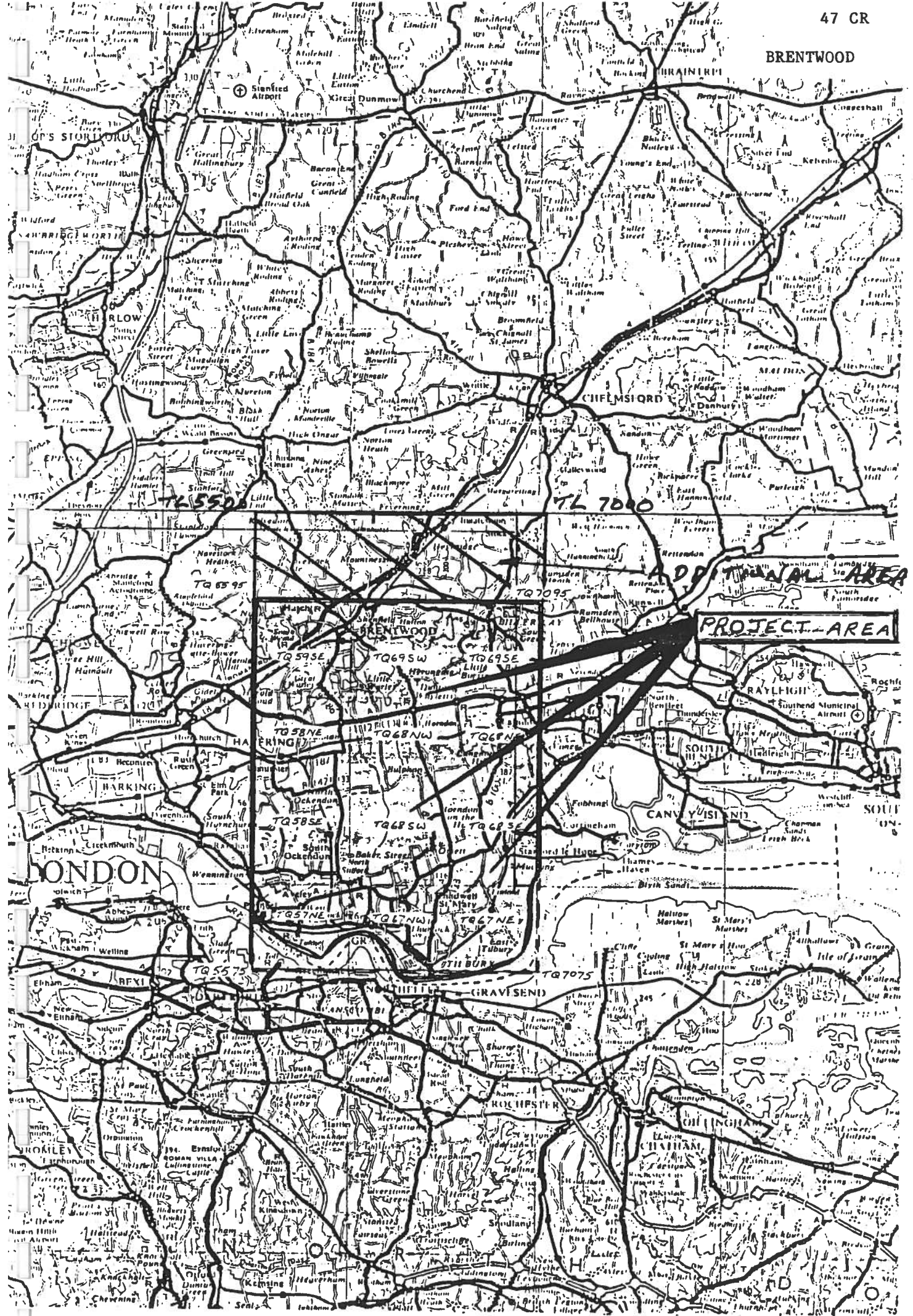






RIVER ESK.





PROJECT AREA

ADDITIONAL AREA

RAYLEIGH

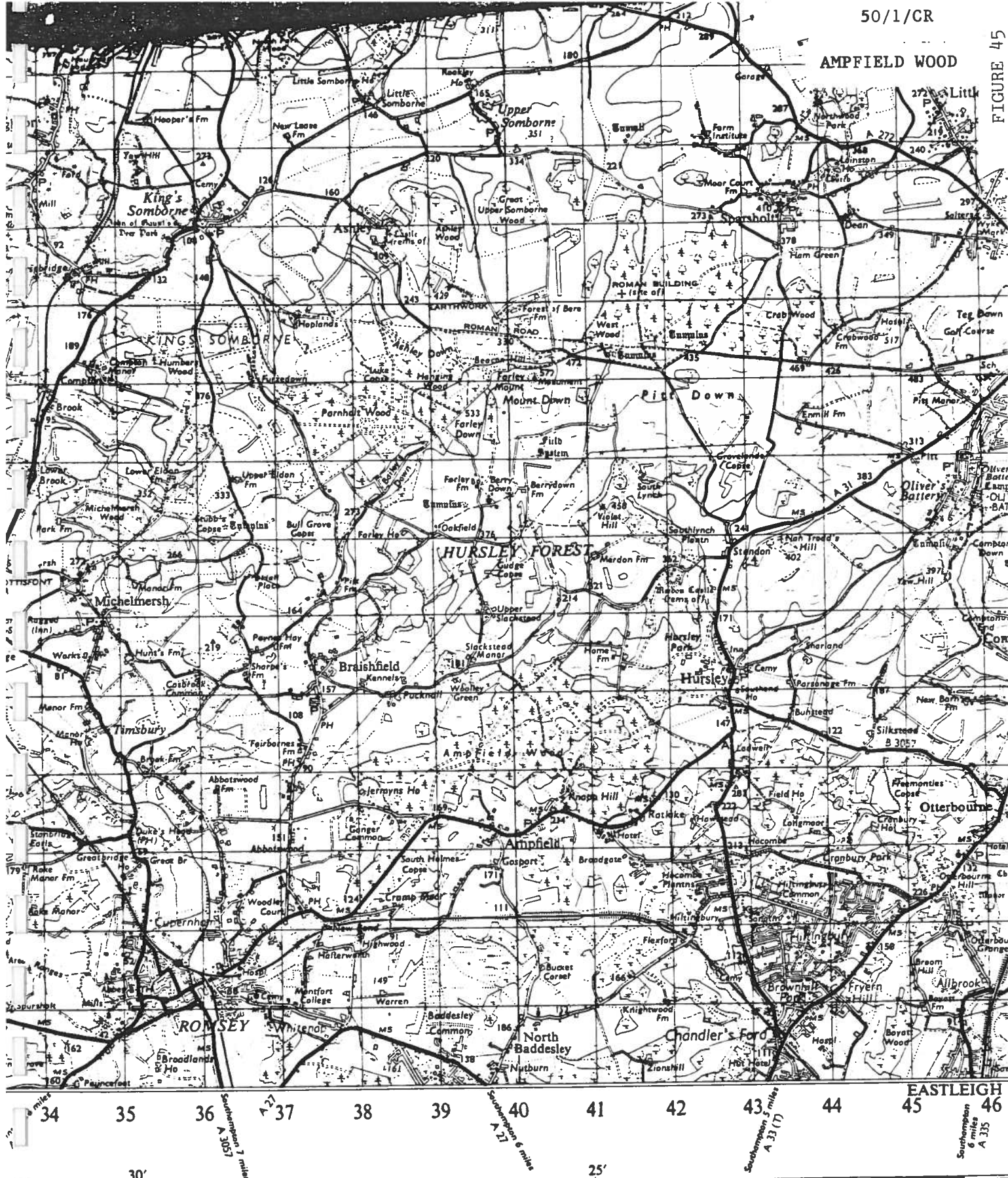
CAN YU ISLAND

LONDON

GRAVESEND

CHILTINGHAM



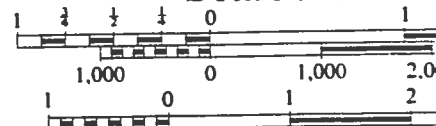


Scale: One I

Difference from Grid North

(1) True North	
0° 19' W	N W Corner
0° 46' W	N E ..
0° 19' W	S W ..
0° 45' W	S E ..

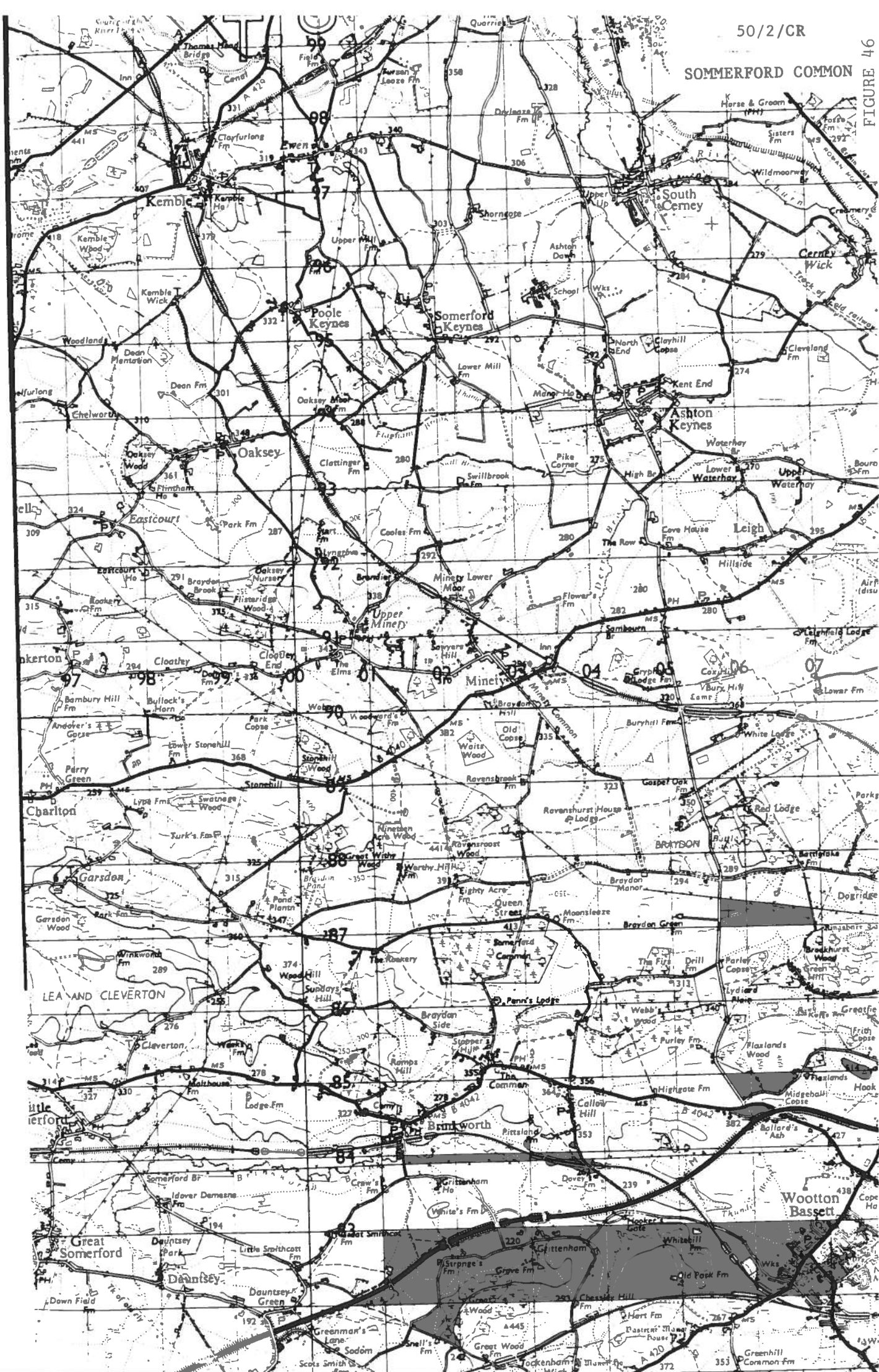
(2) Mag North
about 9' W in 1963
decreasing by about 1' in six years

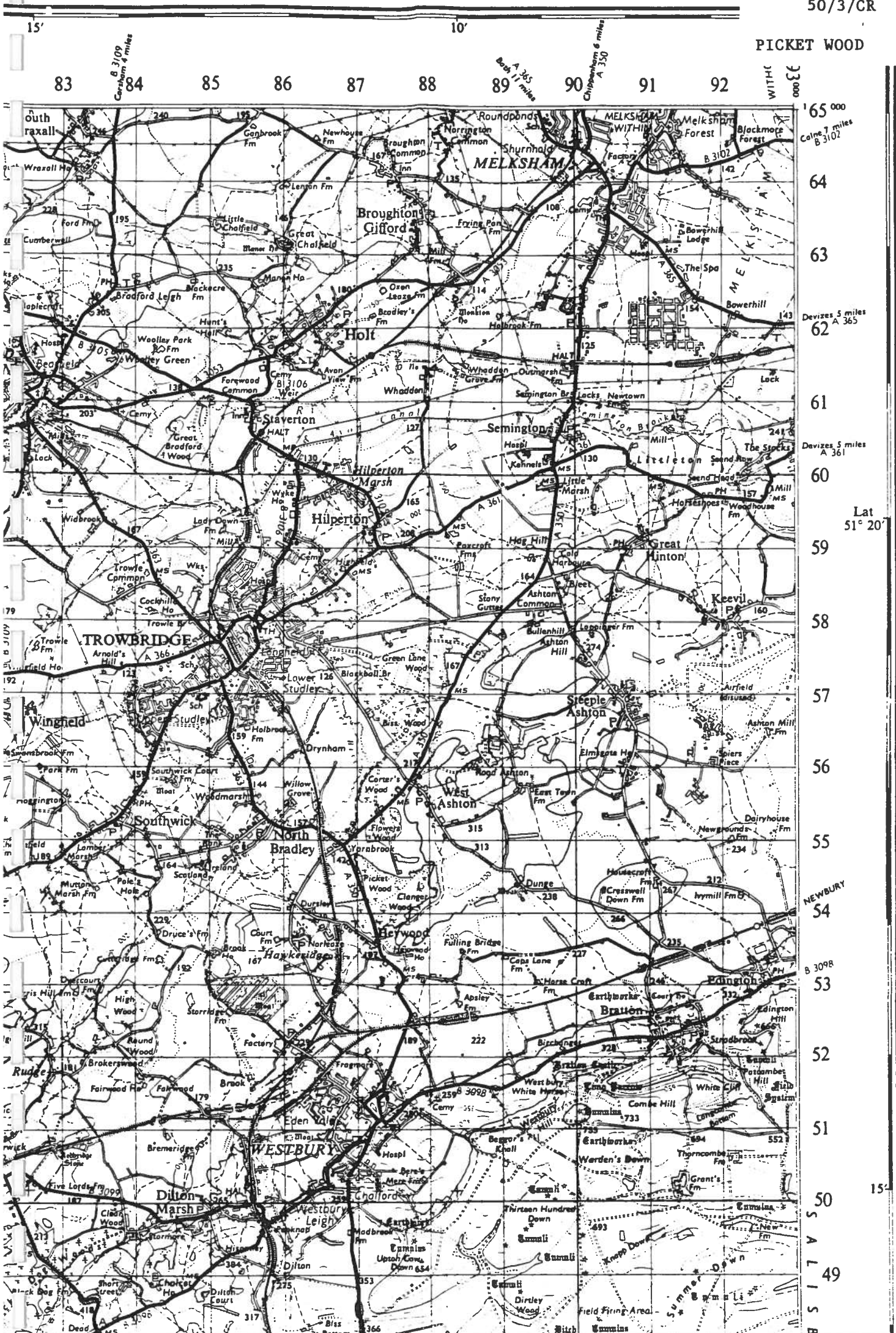


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DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase ..2....

Area No. and Name:	BROOMS BARN	Map Sheet Nos. O/S:	143/155
	86/1		
Flying Height:	3500 M	Direction Flown:	N/S
Flight Conditions:	POOR VIS	No. of Lines:	3
No. of 9" x 9" photo prints:	11	No. of Scan Lines:	5080
Film Forward Overlap (%):	30	No. of CCTs:	3
Ground Speed (knots):	165	Scan Speed rps:	12.5
Time Flown (GMT):	1112-1125	Tape Footage:	274
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase 1..2...

Area No. and Name:	BLAKEY RIDGE	Map Sheet Nos. O/S:	94
	86/2/1		
Flying Height:	1000	Direction Flown:	N/S
Flight Conditions:	DULL	No. of Lines:	3
	4/8		
No. of 9" x 9" photo prints:	CLOUD 3/8	No. of Scan Lines:	13775
	25		
Film Forward Overlap (%):	59	No. of CCTs:	3 3
	30		
Ground Speed (knots):	160 160	Scan Speed rps:	50
Time Flown (GMT):	1040-1056 1241-1253	Tape Footage:	463
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase ...2...

Area No. and Name:	GLAISDALE RIGG	Map Sheet Nos. O/S:	94
	86/2/2		
Flying Height:	1000	Direction Flown:	N/S
Flight Conditions:	3/8 CLOUD	No. of Lines:	3
No. of 9" x 9" photo prints:	29	No. of Scan Lines:	20145
Film Forward Overlap (%):	30	No. of CCTs:	6
Ground Speed (knots):	160	Scan Speed rps:	50
Time Flown (GMT):	1229-1237	Tape Footage:	1034
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase 1..2..3

Area No. and Name:	OXFORD FLOOD PLAIN	Map Sheet Nos. O/S:	164
	86/3		
Flying Height:	1000	Direction Flown:	N/S
			E/W
Flight Conditions:	2/8 3/8 1/8	No. of Lines:	7
	CLOUD CLOUD CLOUD		
No. of 9" x 9" photo prints:		No. of Scan Lines:	
	164 90 71		48175 32435 43225
Film Forward Overlap (%):	30	No. of CCTs:	15 14 14
Ground Speed (knots):	160 135 160	Scan Speed rps:	50
Time Flown (GMT):		Tape Footage:	2563 1723 2324
	1404-1443 0738-0806 1137-1206		
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

1986 SURVEY

Phase ..2...

Area No. and Name:	FELTWELL	Map Sheet Nos. O/S:	143
Flying Height:	86/4 2000	Direction Flown:	E/W
Flight Conditions:	POOR VIS	No. of Lines:	3
No. of 9" x 9" photo prints:	32	No. of Scan Lines:	10910
Film Forward Overlap (%):	30	No. of CCTs:	3
Ground Speed (knots):	160	Scan Speed rps:	25
Time Flown (GMT):	1027-1042	Tape Footage:	574
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ..1...3

Area No. and Name:	RHONDDA	Map Sheet Nos. O/S:	170
Flying Height:	86/6 4000	Direction Flown:	NW SE
Flight Conditions:	3/8 CLOUD HAZE 1/8 CLOUD	No. of Lines:	2 1
No. of 9" x 9" photo prints:	27 6	No. of Scan Lines:	2300 2765
Film Forward Overlap (%):	30	No. of CCTs:	2 1
Ground Speed (knots):	160 165 160	Scan Speed rps:	12.5
Time Flown (GMT):	1231-1240 0851-0854	Tape Footage:	234 139
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase .2...3.

Area No. and Name:	SOUTHOVER HEATH 86/9/1	Map Sheet Nos. O/S:	194
Flying Height:	800	Direction Flown:	N
Flight Conditions:	3/8 CLOUD 1/8 CLOUD HAZE HAZE	No. of Lines:	2
No. of 9" x 9" photo prints:	13 28	No. of Scan Lines:	4565 5460
Film Forward Overlap (%):	30	No. of CCTs:	2 3
Ground Speed (knots):	110/160 160	Scan Speed rps:	50
Time Flown (GMT):	0937-0944 0918-0923 1602-1606	Tape Footage:	247 287
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase 1..2...3

Area No. and Name:	SWANLEY 86/9/2	Map Sheet Nos. O/S:	177
Flying Height:	800	Direction Flown:	N
Flight Conditions:	3/8 CLOUD HAZE	No. of Lines:	2
No. of 9" x 9" photo prints:	24 12 13	No. of Scan Lines:	6260 3365 3550
Film Forward Overlap (%):	30	No. of CCTs:	4 2 2
Ground Speed (knots):	150 160	Scan Speed rps:	50
Time Flown (GMT):	1114-1336 1028-1033 1345 1353	Tape Footage:	330 187 190
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase .2...3..

Area No. and Name:	LEVERTON MARSH	Map Sheet Nos. O/S:	122/131
Flying Height:	86/10 2000 4000	Direction Flown:	NW NE/SW
Flight Conditions:	1/8 CLOUD HAZE	No. of Lines:	1 3
No. of 9" x 9" photo prints:	17 17	No. of Scan Lines:	4420 9305
Film Forward Overlap (%):	30	No. of CCTs:	2 4
Ground Speed (knots):	140 160	Scan Speed rps:	25 12.5
Time Flown (GMT):	1016-1019 1403-1438	Tape Footage:	225 466
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase .1...2.

Area No. and Name:	MORTEN FEN	Map Sheet Nos. O/S:	130
Flying Height:	86/11 800 2000 4000	Direction Flown:	E/W
Flight Conditions:	CLEAR 3/8 CLOUD HAZE	No. of Lines:	4
No. of 9" x 9" photo prints:	38 37	No. of Scan Lines:	11250 12435
Film Forward Overlap (%):	30	No. of CCTs:	4 3
Ground Speed (knots):	165 150/160	Scan Speed rps:	12.5 50
Time Flown (GMT):	1613-1624 0924-0951 0931-1010	Tape Footage:	614 664
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase 2.....

Area No. and Name:	SKIPWITH COMMON	Map Sheet Nos. O/S:	106
Flying Height:	86/12 800	Direction Flown:	N
Flight Conditions:	3/8 CLOUD DULL 6/8 CLOUD	No. of Lines:	5
No. of 9" x 9" photo prints:	16	No. of Scan Lines:	N.P*
Film Forward Overlap (%):	30	No. of CCTs:	N.P
Ground Speed (knots):	140	Scan Speed rps:	50
Time Flown (GMT):	1426-1432 1437-1450	Tape Footage:	757
Research Team Availability:	INA	"S" Bend Correction:	YES

*NOT PRESENTED

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ..1...3..

Area No. and Name:	RIPON	Map Sheet Nos. O/S:	99
Flying Height:	86/14 800	Direction Flown:	N/S
Flight Conditions:	3/8 CLOUD - CLEAR	No. of Lines:	3
No. of 9" x 9" photo prints:	40 21	No. of Scan Lines:	3285 8775
Film Forward Overlap (%):	30	No. of CCTs:	2 5
Ground Speed (knots):	140 160 150	Scan Speed rps:	50
Time Flown (GMT):	1038-1056 1321-1332 1224	Tape Footage:	195 347
Research Team Availability:	INA 1241	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

198 SURVEY

Phase ...1...3.

Area No. and Name:	DERWENT FELS	Map Sheet Nos. O/S:	89
	86/15		
Flying Height:	4000	Direction Flown:	N/S
Flight Conditions:	1/8 2/8	No. of Lines:	3 2
	CLOUD CLOUD		
No. of 9" x 9" photo prints:	28 12	No. of Scan Lines:	5950 3535
	GOOD		
Film Forward Overlap (%):	30	No. of CCTs:	4 2
Ground Speed (knots):	165 160	Scan Speed rps:	12.5
Time Flown (GMT):	1253 - 1315 0953 - 1002	Tape Footage:	320 132
	1253 - 1255		
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ...1.....

Area No. and Name:	TAY ESTUARY	Map Sheet Nos. O/S:	53/54
	86/16		
Flying Height:	2300 1000	Direction Flown:	NW SE N/S
Flight Conditions:	1/8 to 4/8 CLOUD	No. of Lines:	36
No. of 9" x 9" photo prints:	90	No. of Scan Lines:	105610
Film Forward Overlap (%):	30	No. of CCTs:	38
Ground Speed (knots):	155	Scan Speed rps:	50
Time Flown (GMT):	1019 - 1200	Tape Footage:	6029
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase 1..2..3

Area No. and Name:	ESTWATE WATER 86/17	Map Sheet Nos. O/S:	96
Flying Height:	500	Direction Flown:	S N N
Flight Conditions:	1/8 3/8 6/8 3/8 CLOUD CLOUD CLOUD HAZY TURB	No. of Lines:	1 9 7
No. of 9" x 9" photo prints:	N/P 18 23	No. of Scan Lines:	770 9300 19320
Film Forward Overlap (%):	30	No. of CCTs:	1 6 9
Ground Speed (knots):	155 110 120	Scan Speed rps:	50
Time Flown (GMT):	1111 1244-1308 1200-1313 1112 1316-1355	Tape Footage:	44 535 1057
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase 1...2...3

Area No. and Name:	DINNET 86/18	Map Sheet Nos. O/S:	37
Flying Height:	2000	Direction Flown:	E/W
Flight Conditions:	1/8 to 6/8 4/8 6/8 CLOUD CLOUD CLOUD GOOD	No. of Lines:	2
No. of 9" x 9" photo prints:	33 19 21	No. of Scan Lines:	10235 5520 6540
Film Forward Overlap (%):	30	No. of CCTs:	6 2 2
Ground Speed (knots):	165 160 160	Scan Speed rps:	25
Time Flown (GMT):	0909-0915 1045-1226 1231-1241 1506-1520	Tape Footage:	595 282 333
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase 1...2...3

Area No. and Name:	DUDDON ESTUARY	Map Sheet Nos. O/S:	96
	86/20		
Flying Height:	2000	Direction Flown:	S/W NW SW
Flight Conditions:	1/8 GOOD CLOUD GOOD	No. of Lines:	2
No. of 9" x 9" photo prints:	14 11 8	No. of Scan Lines:	5470 7420 4530
Film Forward Overlap (%):	30	No. of CCTs:	2 3 2
Ground Speed (knots):	165 140 160	Scan Speed rps:	25
Time Flown (GMT):	1100 0948-0951 0956-1002 1111 1208-1223 1227-1235	Tape Footage:	294 184 102
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase 1...2...3

Area No. and Name:	HOLDERNESS	Map Sheet Nos. O/S:	107
	86/21		
Flying Height:	800 500	Direction Flown:	S/E S
Flight Conditions:	3/8 3/8 7/8 CLOUD MAX CLOUD HAZE CLOUD DULL	No. of Lines:	4 2
No. of 9" x 9" photo prints:	82 19 17	No. of Scan Lines:	11030 7625 6033
Film Forward Overlap (%):	30	No. of CCTs:	7 3 3
Ground Speed (knots):	140 160 100 150	Scan Speed rps:	50
Time Flown (GMT):	1137-1205 1138-1144 1347-1400 1358-1432	Tape Footage:	596 268 323
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase 1...3...

Area No. and Name:	BAWTRY 26/25	Map Sheet Nos. O/S:	111
Flying Height:	2000	Direction Flown:	N/S
Flight Conditions:	GOOD 5/8 CLOUD TURB	No. of Lines:	3
No. of 9" x 9" photo prints:	23 19	No. of Scan Lines:	11335 10415
Film Forward Overlap (%):	30	No. of CCTs:	3
Ground Speed (knots):	165 160	Scan Speed rps:	12.5 25
Time Flown (GMT):	1402-1416 1252-1313	Tape Footage:	609 527
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase 1....3..

Area No. and Name:	BAWTRY 86/26/1	Map Sheet Nos. O/S:	111
Flying Height:	2000	Direction Flown:	N/E/W
Flight Conditions:	GOOD 5/8 CLOUD TURB	No. of Lines:	3
No. of 9" x 9" photo prints:	15 12	No. of Scan Lines:	5815 5630
Film Forward Overlap (%):	30	No. of CCTs:	3 3
Ground Speed (knots):	165 160	Scan Speed rps:	12.5 25
Time Flown (GMT):	1419-1426 1226-1247	Tape Footage:	377 374
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase .2.....

Area No. and Name:	BURGHCLERE COMMON	Map Sheet Nos. O/S:	174
	86/28/2		
Flying Height:	2000	Direction Flown:	N
Flight Conditions:	3/8 MAX CLOUD COVER	No. of Lines:	2
No. of 9" x 9" photo prints:	6	No. of Scan Lines:	3080
Film Forward Overlap (%):	30	No. of CCTs:	2
Ground Speed (knots):	140 150	Scan Speed rps:	25
Time Flown (GMT):	0816-0822 0832-0833	Tape Footage:	162
	1016-1017		
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ..2...

Area No. and Name:	YATELEY COMMON	Map Sheet Nos. O/S:	186
	86/28/3		
Flying Height:	2000	Direction Flown:	N
Flight Conditions:	2/8 CLOUD GOOD	No. of Lines:	1
No. of 9" x 9" photo prints:	4	No. of Scan Lines:	265
Film Forward Overlap (%):	30	No. of CCTs:	1
Ground Speed (knots):	145	Scan Speed rps:	25
Time Flown (GMT):	0945-0946	Tape Footage:	76
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase ..2....

Area No. and Name:	BROXHEAD COMMON	Map Sheet Nos. O/S:	186
	86/28/4		
Flying Height:	2000	Direction Flown:	S
Flight Conditions:	3/8 CLOUD	No. of Lines:	1
No. of 9" x 9" photo prints:	5	No. of Scan Lines:	1705
Film Forward Overlap (%):	30	No. of CCTs:	1
Ground Speed (knots):	150	Scan Speed rps:	25
Time Flown (GMT):	0935 - 0936	Tape Footage:	85
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic Scanner with AADS 1840 film converter unit and Sabre III tape recorder

Phase ..2....

Area No. and Name:	AVON VALLEY	Map Sheet Nos. O/S:	184 195
	86/29		
Flying Height:	4000	Direction Flown:	SE S W N
Flight Conditions:	NO CLOUD/HAZE	No. of Lines:	4
No. of 9" x 9" photo prints:	51	No. of Scan Lines:	PHOTO ONLY
Film Forward Overlap (%):	30	No. of CCTs:	
Ground Speed (knots):	-	Scan Speed rps:	
Time Flown (GMT):	1057 - 1134	Tape Footage:	
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic Scanner with AADS 1840 film converter unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase ..3....

Area No. and Name:	RIVER CONWAY 86/30/1	Map Sheet Nos. O/S:	116
Flying Height:	2000 FT	Direction Flown:	N
Flight Conditions:	GOOD	No. of Lines:	10
No. of 9" x 9" photo prints:	217	No. of Scan Lines:	PHOTO ONLY
Film Forward Overlap (%):	30	No. of CCTs:	
Ground Speed (knots):	-	Scan Speed rps:	
Time Flown (GMT):	1304 - 1520	Tape Footage:	
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ..2....

Area No. and Name:	IRISH SEA 86/30/4	Map Sheet Nos. O/S:	116
Flying Height:	2000 1000	Direction Flown:	N/S
Flight Conditions:	3/8 CLOUD MAX	No. of Lines:	9
No. of 9" x 9" photo prints:	60	No. of Scan Lines:	44695
Film Forward Overlap (%):	30	No. of CCTs:	14
Ground Speed (knots):	140	Scan Speed rps:	12.5 25 50
Time Flown (GMT):	0916 - 1051	Tape Footage:	2663
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase ..2...3.

Area No. and Name:	SWAVESLEY FEN 86/32/1	Map Sheet Nos. O/S:	142 154
Flying Height:	4000 4000 1000 2000 1000 1000	Direction Flown:	N/S
Flight Conditions:	500 500 3/8 CLOUD GOOD HAZE	No. of Lines:	3 4
No. of 9" x 9" photo prints:	17 26	No. of Scan Lines:	7100 7750
Film Forward Overlap (%):	30	No. of CCTs:	3 4
Ground Speed (knots):	110 110 160 160	Scan Speed rps:	50 12.5 25 50
Time Flown (GMT):	1038 - 1040 1425 - 1519 1216 - 1238	Tape Footage:	387 397
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ..2...3.

Area No. and Name:	WOODWALTON 86/32/2	Map Sheet Nos. O/S:	142
Flying Height:	4000 4000 1000 2000 1000 1000	Direction Flown:	N/S
Flight Conditions:	500 500 3/8 GOOD CLOUD HAZE	No. of Lines:	3 4
No. of 9" x 9" photo prints:	21 21	No. of Scan Lines:	6005 6785
Film Forward Overlap (%):	30	No. of CCTs:	3 4
Ground Speed (knots):	160 110 160 160	Scan Speed rps:	50 12.5 25 50
Time Flown (GMT):	1046 - 1047 1414 - 1525 1224 - 1245	Tape Footage:	331 349
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase ..2....3

Area No. and Name:	MONKS WOOD 86/32/3	Map Sheet Nos. O/S:	142
Flying Height:	4000 4000 2000	Direction Flown:	N/S
Flight Conditions:	1000 1000 500 500	No. of Lines:	3 4
No. of 9" x 9" photo prints:	3/8 CLOUD HAZE GOOD 17 20	No. of Scan Lines:	3205 6150
Film Forward Overlap (%):	30	No. of CCTs:	3 4
Ground Speed (knots):	110 180 160	Scan Speed rps:	12.5 12.5 25 50
Time Flown (GMT):	1054 - 1056 1412 - 1528	Tape Footage:	184 338
	1228 - 1248		
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ..1....

Area No. and Name:	STRATHY 86/33/1	Map Sheet Nos. O/S:	10
Flying Height:	25000 15000 1000	Direction Flown:	N
Flight Conditions:	4/8 CLOUD	No. of Lines:	7
No. of 9" x 9" photo prints:	29	No. of Scan Lines:	13275
Film Forward Overlap (%):	30	No. of CCTs:	9
Ground Speed (knots):	150 165	Scan Speed rps:	25 50
Time Flown (GMT):	1010 - 1017 1044 - 1056	Tape Footage:	784
	1309 - 1330		
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase ..1...3

Area No. and Name:	RIMSDALE 86/33/2	Map Sheet Nos. O/S:	16
Flying Height:	2000	Direction Flown:	N/S N
Flight Conditions:	4/8 2/8 CLOUD CLOUD GOOD	No. of Lines:	1
No. of 9" x 9" photo prints:	5 2	No. of Scan Lines:	2825 1345
Film Forward Overlap (%):	30	No. of CCTs:	2 1
Ground Speed (knots):	165 160	Scan Speed rps:	25
Time Flown (GMT):	0948 - 0954 0920 - 0925	Tape Footage:	163 65
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ..1...3.

Area No. and Name:	POLLIE HILL 86/33/3	Map Sheet Nos. O/S:	16 17
Flying Height:	1000 2000	Direction Flown:	N E
Flight Conditions:	4/8 2/8 CLOUD CLOUD GOOD	No. of Lines:	3
No. of 9" x 9" photo prints:	16 3	No. of Scan Lines:	4515 2315
Film Forward Overlap (%):	30	No. of CCTs:	3 2
Ground Speed (knots):	150 160	Scan Speed rps:	50 25
Time Flown (GMT):	1345 - 1400 0905 - 0915 1003 - 1004	Tape Footage:	276 120
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase ...1...3.

Area No. and Name:	NORTH DALCHORK 86/33/4	Map Sheet Nos. O/S:	16
Flying Height:	2500 1000 1500	Direction Flown:	N. NW/SE NW
Flight Conditions:	4/8 6/8 CLOUD CLOUD	No. of Lines:	1 3
No. of 9" x 9" photo prints:	40 16	No. of Scan Lines:	21465 12335
Film Forward Overlap (%):	30	No. of CCTs:	7 5
Ground Speed (knots):	150 160 150	Scan Speed rps:	25 50 25
Time Flown (GMT):	1029 - 1031 0936 - 0956	Tape Footage:	1123 630
	1406 - 1423		
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ...3.....

Area No. and Name:	POULRAY 86/33/5	Map Sheet Nos. O/S:	33 34
Flying Height:	2000 1500	Direction Flown:	E/W
Flight Conditions:	4/8 CLOUD GOOD	No. of Lines:	3
No. of 9" x 9" photo prints:	14	No. of Scan Lines:	6975
Film Forward Overlap (%):	30	No. of CCTs:	3
Ground Speed (knots):	130 140	Scan Speed rps:	12.5 25
Time Flown (GMT):	1153 - 1203 1315 - 1318	Tape Footage:	255
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase ...1....

Area No. and Name:	SKOMER ISLAND 86/34/1	Map Sheet Nos. O/S:	157
Flying Height:	4000	Direction Flown:	N/S
Flight Conditions:	3/8 CLOUD	No. of Lines:	1
No. of 9" x 9" photo prints:	5	No. of Scan Lines:	1125
Film Forward Overlap (%):	30	No. of CCTs:	1
Ground Speed (knots):	165	Scan Speed rps:	12.5
Time Flown (GMT):	0930 0932	Tape Footage:	57
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ...1....

Area No. and Name:	WESTANGLE BAY 86/34/2	Map Sheet Nos. O/S:	157
Flying Height:	4000	Direction Flown:	SE
Flight Conditions:	1/8 CLOUD	No. of Lines:	1
No. of 9" x 9" photo prints:	2	No. of Scan Lines:	560
Film Forward Overlap (%):	30	No. of CCTs:	1
Ground Speed (knots):	165	Scan Speed rps:	12.5
Time Flown (GMT):	0924 0926	Tape Footage:	29
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase ..1.....

Area No. and Name:	FRESHWATER WEST 86/34/3	Map Sheet Nos. O/S:	158
Flying Height:	4000	Direction Flown:	NW
Flight Conditions:	1/8 CLOUD	No. of Lines:	1
No. of 9" x 9" photo prints:	2	No. of Scan Lines:	880
Film Forward Overlap (%):	30	No. of CCTs:	1
Ground Speed (knots):	165	Scan Speed rps:	12.5
Time Flown (GMT):	0919 0920	Tape Footage:	44
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ..1.....

Area No. and Name:	STACKPOLE QUAY 86/34/4	Map Sheet Nos. O/S:	158
Flying Height:	4000	Direction Flown:	NW
Flight Conditions:	1/8 CLOUD	No. of Lines:	1
No. of 9" x 9" photo prints:	3	No. of Scan Lines:	530
Film Forward Overlap (%):	30	No. of CCTs:	1
Ground Speed (knots):	165	Scan Speed rps:	12.5
Time Flown (GMT):	0912 0913	Tape Footage:	27
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase .1.3...

Area No. and Name:	BARTON BROAD 86/35/1	Map Sheet Nos. O/S:	134
Flying Height:	4000	Direction Flown:	N - S
Flight Conditions:	2/8 1/8 CLOUD CLOUD HAZE	No. of Lines:	2 - 1
No. of 9" x 9" photo prints:	8 7	No. of Scan Lines:	1505 2055
Film Forward Overlap (%):	30	No. of CCTs:	1
Ground Speed (knots):	180 160	Scan Speed rps:	12.5
Time Flown (GMT):	1029-1032 1458 - 1500 1139-1142	Tape Footage:	76 103
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ..3....

Area No. and Name:	BLEWBURY 86/35/2	Map Sheet Nos. O/S:	174
Flying Height:	4000	Direction Flown:	N
Flight Conditions:	1/8 CLOUD HAZE	No. of Lines:	1
No. of 9" x 9" photo prints:	6	No. of Scan Lines:	1455
Film Forward Overlap (%):	30	No. of CCTs:	1
Ground Speed (knots):	160	Scan Speed rps:	12.5
Time Flown (GMT):	1046 - 1049	Tape Footage:	73
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase .2....

Area No. and Name:	SOUTHAMPTON WATER 86/37	Map Sheet Nos. O/S:	196
Flying Height:	2500	Direction Flown:	NW
Flight Conditions:	GOOD	No. of Lines:	2
No. of 9" x 9" photo prints:	19	No. of Scan Lines:	6015
Film Forward Overlap (%):	30	No. of CCTs:	3
Ground Speed (knots):	130	Scan Speed rps:	12.5
Time Flown (GMT):	0816 - 0818 1001 - 1004 0911 - 0913	Tape Footage:	292
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ..2....

Area No. and Name:	CARNEDDAU COASTAL STRIP 86/42/2	Map Sheet Nos. O/S:	
Flying Height:		Direction Flown:	
Flight Conditions:		No. of Lines:	
No. of 9" x 9" photo prints:		No. of Scan Lines:	
Film Forward Overlap (%):		No. of CCTs:	
Ground Speed (knots):		Scan Speed rps:	
Time Flown (GMT):		Tape Footage:	
Research Team Availability:		"S" Bend Correction:	YES

ABORTED DUE TO WEATHER

ABORTED DUE TO WEATHER

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase ..2..3.

Area No. and Name:	NANTLLE RIDGE 86/42/3	Map Sheet Nos. O/S:	115/124
Flying Height:	2000 2000 4000	Direction Flown:	N SE N/S N/S
Flight Conditions:	3/8 CLOUD MAX GOOD	No. of Lines:	2 4
No. of 9" x 9" photo prints:	17 16	No. of Scan Lines:	9930 12425
Film Forward Overlap (%):	30	No. of CCTs:	4 5
Ground Speed (knots):	140 160	Scan Speed rps:	25
Time Flown (GMT):	1430 - 1436 0857 - 0910 0900 - 0902	Tape Footage:	558 643
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ..3....

Area No. and Name:	DOLGEWLLAU 86/43	Map Sheet Nos. O/S:	124
Flying Height:	4000	Direction Flown:	NW/SE N.S
Flight Conditions:	2/8 CLOUD HAZE	No. of Lines:	4
No. of 9" x 9" photo prints:	22	No. of Scan Lines:	13485
Film Forward Overlap (%):	30	No. of CCTs:	7
Ground Speed (knots):	160	Scan Speed rps:	12.5
Time Flown (GMT):	0838 - 0853 1030 - 1034 0910 - 0911	Tape Footage:	692
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase ..2....

Area No. and Name:	BENTLEY WOOD 86/44/1 CR	Map Sheet Nos. O/S:	184
Flying Height:	2500 FT	Direction Flown:	N
Flight Conditions:	GOOD	No. of Lines:	5
No. of 9" x 9" photo prints:	50	No. of Scan Lines:	N/A
Film Forward Overlap (%):	30	No. of CCTs:	N/A
Ground Speed (knots):	N/A	Scan Speed rps:	N/A
Time Flown (GMT):	1142-1208	Tape Footage:	N/A
Research Team Availability:	INA	"S" Bend Correction:	N/A

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ...²....

Area No. and Name:	WHITCROSS GREEN WOOD 86/44/2 CR	Map Sheet Nos. O/S:	164
Flying Height:	2500 FT	Direction Flown:	NW
Flight Conditions:	GOOD	No. of Lines:	1
No. of 9" x 9" photo prints:	6	No. of Scan Lines:	N/A
Film Forward Overlap (%):	30	No. of CCTs:	N/A
Ground Speed (knots):	N/A	Scan Speed rps:	N/A
Time Flown (GMT):	0853-0854	Tape Footage:	N/A
Research Team Availability:	INA	"S" Bend Correction:	N/A

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase .2.....

Area No. and Name:	SHABBINGTON WOOD 86/44/3 CR	Map Sheet Nos. O/S:	164
Flying Height:	2500 FT	Direction Flown:	NE
Flight Conditions:	GOOD	No. of Lines:	4
No. of 9" x 9" photo prints:	30	No. of Scan Lines:	N/A
Film Forward Overlap (%):	30	No. of CCTs:	N/A
Ground Speed (knots):	N/A	Scan Speed rps:	N/A
Time Flown (GMT):	0858-0859	Tape Footage:	N/A
Research Team Availability:	INA	"S" Bend Correction:	N/A

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase .2.....

Area No. and Name:	WATERPERRY WOOD 86/44/4 CR	Map Sheet Nos. O/S:	164
Flying Height:	2500 FT	Direction Flown:	NE
Flight Conditions:	GOOD	No. of Lines:	2
No. of 9" x 9" photo prints:	11	No. of Scan Lines:	N/A
Film Forward Overlap (%):	30	No. of CCTs:	N/A
Ground Speed (knots):	N/A	Scan Speed rps:	N/A
Time Flown (GMT):	0904-0921	Tape Footage:	N/A
Research Team Availability:	INA	"S" Bend Correction:	N/A

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase ..2..3.

Area No. and Name:	RIVER ESK 86/46/CR	Map Sheet Nos. O/S:	89/96
Flying Height:	1000 2000	Direction Flown:	NE E SE
Flight Conditions:	3/8 2/8 CLOUD MAX CLOUD	No. of Lines:	4 2
No. of 9" x 9" photo prints:	22 25	No. of Scan Lines:	8920 7465
Film Forward Overlap (%):	30	No. of CCTs:	4 2
Ground Speed (knots):	100 160	Scan Speed rps:	25
Time Flown (GMT):	1236 - 1258 0930 - 0941	Tape Footage:	470 381
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ..3.....

Area No. and Name:	BRENTWOOD 86/47/CR	Map Sheet Nos. O/S:	167/177
Flying Height:	2000	Direction Flown:	N/S
Flight Conditions:	HAZE NO CLOUD	No. of Lines:	7
No. of 9" x 9" photo prints:	201	No. of Scan Lines:	62350
Film Forward Overlap (%):	30	No. of CCTs:	18
Ground Speed (knots):	160/170	Scan Speed rps:	25
Time Flown (GMT):	1130 - 1139 1215 - 1338	Tape Footage:	3173
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

DETAILS OF AREAS SURVEYED

1986 SURVEY

Phase ...3....

Area No. and Name:	ROTHAMSTED 86/48	Map Sheet Nos. O/S:	166
Flying Height:	500 M	Direction Flown:	NE
Flight Conditions:	1/8 CLOUD	No. of Lines:	1
No. of 9" x 9" photo prints:	3	No. of Scan Lines:	990
Film Forward Overlap (%):	30	No. of CCTs:	1
Ground Speed (knots):	110	Scan Speed rps:	50
Time Flown (GMT):	1318-1321	Tape Footage:	53
Research Team Availability:	INA	"S" Bend Correction:	YES

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ...³.....

Area No. and Name:	AMPFIELD WOOD 86/50/1 CR	Map Sheet Nos. O/S:	185
Flying Height:	2500	Direction Flown:	E
Flight Conditions:	2/8 CLOUD HAZE	No. of Lines:	3
No. of 9" x 9" photo prints:	32	No. of Scan Lines:	N/A
Film Forward Overlap (%):	30	No. of CCTs:	N/A
Ground Speed (knots):	N/A	Scan Speed rps:	N/A
Time Flown (GMT):	1327-1401	Tape Footage:	N/A
Research Team Availability:	INA	"S" Bend Correction:	N/A

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

1986 SURVEY

Phase 3.....

Area No. and Name:	SOMMERFORD COMMON	Map Sheet Nos. O/S:	173
	86/50/2 CR		
Flying Height:	2500 FT	Direction Flown:	W
Flight Conditions:	2/8 CLOUD HAZE	No. of Lines:	2
No. of 9" x 9" photo prints:	12	No. of Scan Lines:	N/A
Film Forward Overlap (%):	30	No. of CCTs:	N/A
Ground Speed (knots):	N/A	Scan Speed rps:	N/A
Time Flown (GMT):	0937-0948	Tape Footage:	N/A
Research Team Availability:	INA	"S" Bend Correction:	N/A

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder

Phase ...3....

Area No. and Name:	PICKET WOOD	Map Sheet Nos. O/S:	183
	86/50/3 CR		
Flying Height:	2500 FT	Direction Flown:	W
Flight Conditions:	2/8 CLOUD HAZE	No. of Lines:	3
No. of 9" x 9" photo prints:	14	No. of Scan Lines:	N/A
Film Forward Overlap (%):	30	No. of CCTs:	N/A
Ground Speed (knots):	N/A	Scan Speed rps:	N/A
Time Flown (GMT):	0919-0924	Tape Footage:	N/A
Research Team Availability:	INA	"S" Bend Correction:	N/A

Aircraft: N.E.R.C. Navajo Chieftain G-BBXX

Camera: Wild RC8. wide angle 6" 15 Vag 396 lens

Scanner: Daedalus AADS 1268 11 channel Thematic
Scanner with AADS 1840 film converter
unit and Sabre III tape recorder